DOCUMENT RESUME

ED 392 446 IR 055 828

AUTHOR	Brugger, Judith M., Comp.; And Others
TITLE	Technical Services Workstations. SPEC Kit 213.
INSTITUTION	Association of Research Libraries, Washington, D.C. Office of Management Services.
REPORT NO	ISSN-0160-3582
PUB DATE	Feb 96
NOTE	181p.; Contains drawings and illustrations that may not reproduce clearly.
AVAILABLE FROM	Association of Research Libraries, Office of Management Services, 21 Dupont Circle, N.W., Washington, DC 20036.
PUB TYPE	Guides - Non-Classroom Use (055) -- Reports - Research/Technical (143) -- Tests/Evaluation Instruments (160)
EDRS PRICE	MF01/PC08 Plus Postage.
DESCRIPTORS	Academic Libraries; Cataloging; Higher Education; Human Factors Engineering; *Library Statistics; Library Surveys; *Library Technical Processes; *Microcomputers; *Research Libraries; *Workstations
IDENTIFIERS	*Association of Research Libraries

ABSTRACT

Technical services workstations (TSWs) are personal computers that have been customized for use in technical services departments. To gather information on their use and prevalence in research libraries, the Program for Cooperative Cataloging Standing Committee on Automation surveyed the 119 members of the Association of Research Libraries (ARL) in 1995. Sixty libraries responded. Of these, 39 use TSWs, 15 planned to use them but had not acquired them yet, and 6 had no plans to install them. Each of those libraries using TSWs cataloged an average of 65,073 titles annually, while ones without TSWs averaged 31,478 titles. Dell was most frequently cited as the hardware manufacturer of choice among TSW libraries, with all but five relying on IBM-compatible machines. With regard to hardware configurations, 80486-based processors were used in 53% of TSWs and Pentium-based processors in 35%. Over half (59%) of TSWs had 16 megabytes of random access memory (RAM). Local area networks were in place in 84% of the responding libraries, with Novell the most common manufacturer. Most of the libraries reported that the software on their customized TSWs could display the full American Library Association (ALA) character set under certain circumstances (71%), could use cut/paste functionalities (95%), and could use macros with hot keys (76%). Microsoft Windows is the graphical user interface in 94% of TSWs. Since 98% of responding libraries support telnet, they have, at least theoretically speaking, integrated access to bibliographic utilities from the desktop. Repetitive strain injuries have been reported in 81% of responding libraries, and many of them have invested in ergonomic appliances. Besides survey results, the kit also includes a sample equipment upgrade proposal, sample training documents and supplementary materials, tools with which to assess the ergonomics of workstations, and suggested physical exercises for counteracting strains of extended terminal use. (Contains 11 references.) (BEW)

Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

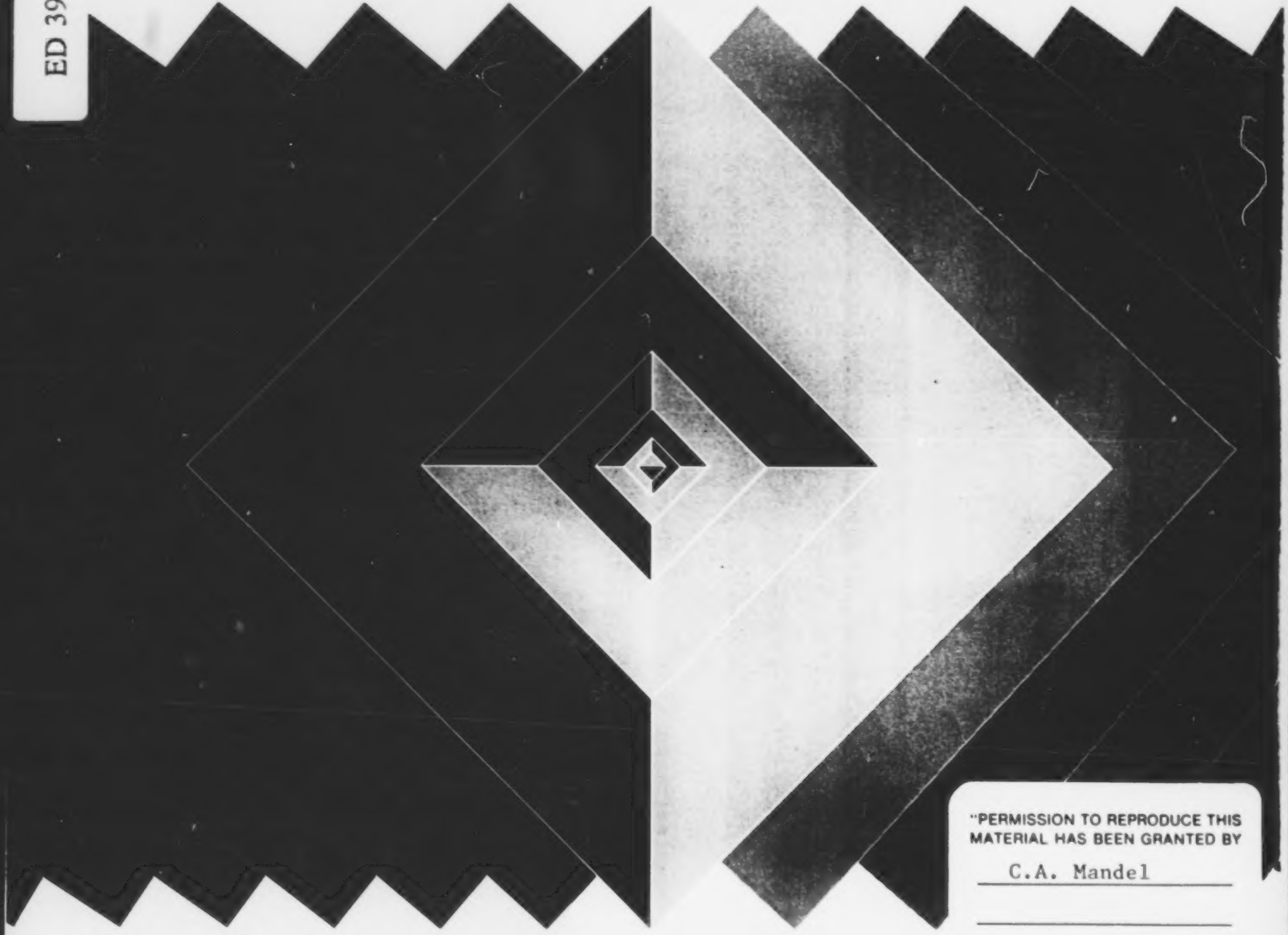
SPEC

SYSTEMS AND PROCEDURES EXCHANGE CENTER

Kit 213

Technical Services Workstations
February 1996

ED 392 446



"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
C.A. Mandel
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

IR055838

ASSOCIATION OF RESEARCH LIBRARIES — OFFICE OF MANAGEMENT SERVICES

BEST COPY AVAILABLE

SPEC
SYSTEMS AND PROCEDURES EXCHANGE CENTER

Flyer 213

Technical Services Workstations
February 1996

INTRODUCTION

Technical Services Workstations (TSWs) are rapidly replacing dumb terminals in technical services departments. A number of factors are contributing to this basic shift in the mode of library operations, including aging of once-standard terminal platforms, manufacturers' decisions to cease offering maintenance contracts on those terminals, and the changing economics of the terminal-personal computer-human resource equation. Personal computers have fallen so far, so fast in price that it no longer makes sense to invest in dumb terminals when the added functionality of a personal computer is factored into the decision. These computers can do double-duty as computers engaged in technical services operations, as well as being capable of the entire range of administrative applications (word-processing, spreadsheets, email, etc.). LANs and Internet access are almost universal for those institutions that have invested in large numbers of personal computers for technical services use. Technical services staff are well-positioned and quite accustomed to dealing with a world-wide, networked community of similar professionals.

The TSW can then be defined as a personal computer that has been customized for use in technical services departments, but which also includes the entire suite of standard administrative applications. Furthermore, it does not exist in isolation, but is a networked device, located either on a local area network or a TCP/IP campus network, and from there connected to the Internet.

SURVEY RESULTS

Of the 119 ARL member institutions, 60 (50%) responded to the Program for Cooperative Cataloging Standing Committee on Automation's 1995 survey on Technical Services Workstations. Of these, 15 (25%) indicated that, although they had not yet installed any TSWs, they were planning to do so. Six (10%) others indicated that they had not yet made any plans to install workstations. TSWs were already in use at 39 institutions (65%).

Personal computers are now generations removed from those machines described in 1984 in SPEC Kit #104 *Microcomputers in ARL Libraries*, which recommended "[t]he IBM personal computer, equipped with two double-sided disk drives, 128K of memory, and a character oriented monitor ... as the first choice" (p. 37). In 1984, a computer with that configuration cost approximately $4000; had that computer's cost kept up with the national CPI, it would have cost $5760 in 1994.

The survey reveals that libraries are now moving much closer to business-world standards for new installations, with Pentium-based machines moving into the forefront of all new purchases. As libraries increasingly find themselves operating more like for-profit businesses and under pressure to improve their efficiencies and technical services throughput, investing in powerful TSWs has come to make more and more sense from every perspective. The growing installed base of TSWs is also related to the growing array of tools and applications available for use on these computers. Development of applications such as the Library of Congress' *Cataloger's Desktop* is going hand-in-hand with vendors' development of integrated platforms for technical services staff.

When broken down into the Technical Services Workstation and the non-Technical Services Workstation groups, the ARL libraries that responded seemed to fall naturally into polar categories. The 37 institutions that use workstations and reported their yearly titles cataloged had an average annual production of 65,073 titles, ranging from a high of 195,460 to a low of 17,322 titles. At the other end of the spectrum, 21 institutions that have not yet adopted workstation technology cataloged an average of 31,478 titles, ranging from a high of 50,173 to a low of 17,244 titles.

HARDWARE

Institutions reported purchasing their TSWs from a variety of manufacturers (IBM, Compaq, Dell), but Dell was the manufacturer most frequently mentioned. Local suppliers/systems integrators were also used by ARL libraries. IBM-compatible machines clearly rule the library market, with only a single ARL library relying exclusively on Macintoshes and five reporting a mixture of Macintoshes and IBM-compatible personal computers. It is worth noting that, among these institutions, the PowerMac 6100/7100 is a common choice; it has the advantage of satisfying the fervent Macintosh clientele while offering compatibility with library software and tools that are available only for the PC world.

The PCC Standing Committee on Automation's predecessor, the Cooperative Cataloging Council's Automation Task Group, conducted an Internet survey of TSWs in August 1994. The changes in standard hardware configurations in that period are striking and show that libraries are moving closer to standard business hardware configurations than had been the case previously.

Standard hardware configurations for the IBM-compatible PCs in 1995 indicate that 80486-based processor (53%) and Pentium-based processor (35%) control the vast majority of the TSW market (88%). At a distant third are 80386-based machines (9%), and 80286 (AT) machines now appear at only two institutions. Since 1994, 8088-based PCs have disappeared entirely from the TSW horizon.

The amount of memory (RAM) installed in newly purchased machines has skyrocketed. While ranging from 4 to 24 MB, 59% of the respondents are purchasing machines with 16 MB RAM and 31% machines with 8 MB RAM. Distinctly in the minority are the 10% buying only 4 MB RAM.

An overwhelming 84% of those libraries that responded to the survey have LANs. Novell is the most common at 58%. While it is true that installation on LANs makes the size of the desktop hard drive somewhat irrelevant, 90% of the PCs have 300 MB and up, and 56% have 500 MB and up. The typical size of a hard drive is now 540 MB.

SOFTWARE

The Technical Services Workstation is a computer that has a level of customization specifically intended for staff who deal in technical services operations, meaning administrative software applications are but one component. Software necessary to input and update the local online catalog for all aspects of technical services constitutes a basic level of functionality. That software should support the full ALA character set for display, input/update, and printing, but this is far from universal to date. In technical services mode only 71% of the responding libraries can display the full character set; only 20% can print the ALA character set at all times, and 60% can only do it under certain circumstances.

Cut/paste functionality exists in virtually all (95%) of the TSWs, and 76% report that they have macro capability with hot keys. Just over half (51%) of the responding institutions have loaded the LC *Cataloger's Desktop*.

Microsoft Windows has become the graphical user interface (GUI) of choice. Fully 94% of reporting institutions use Windows on at least some of their workstations. While this is hardly surprising, it is interesting to see that there has been this degree of penetration of the library TSW marketplace in advance of the release of Windows versions of software packages for such common applications as OCLC's Passport. (OCLC released version 1.0 of Passport for Windows in December 1995.) What this statistic does not measure is the degree to which libraries have consolidated *all* of their technical services applications, including OPAC access, under a Windows interface. With the release of RLIN's Windows software and now OCLC's Passport for Windows, we can expect those institutions that have not wholeheartedly committed to Windows interfaces to consider their situations more concretely.

Another consideration is the level and ease of access to the bibliographic utilities from the workstation desktop. While a year ago the Automation Task Group's TSW survey measured the level of OCLC TLP and RLIN EtherTerm access—LAN-based means of accessing the bibliographic utilities primarily directed at the largest libraries—that issue has been clouded by the fact that OCLC and RLIN now both support Internet access to their databases for technical services use. Since 98% of the responding libraries support Telnet, 98% of the libraries therefore at least theoretically have integrated access to the utilities from their desktops.

ERGONOMIC CONSIDERATIONS

Libraries are no different from the rest of the information industry in having to deal with ergonomic considerations, including various types of physical injuries. An alarming 81% reported problems such as repetitive strain injuries, back and eye strain, etc. That correlates strongly with the percentages that have invested in many different types of ergonomic appliances, from footrests to adjustable keyboards to articulated mouse trays, to encouraging exercise programs and adjusting schedules.

CONCLUSION

It is readily apparent that Technical Services Workstations are making rapid inroads into technical services departments. Moreover, libraries are no longer "making do" with obsolete machines. The level of processing power (CPU), the amount of memory (RAM), and the size of the hard drives are all increasing rapidly. More applications and tools specifically intended for technical services staff are appearing and making the workstations themselves more useful and more self-contained as resource platforms; they represent a future trend toward "holistic" acquisitions and cataloging.

Libraries, in general, and technical services, in particular, are in the forefront of creating their own networked communities, and technical services departments are placing many essential resources on the World Wide Web where they are accessible to their colleagues. Technical services departments are responding to various controversies such as calls to outsource cataloging operations, downsize, and restructure by investing in the equipment required to do their jobs in a more efficient, cost-effective manner. Technical Services Workstations are emerging as the key to making all this happen.

This Kit and Flyer were compiled by members of the Program for Cooperative Cataloging's Standing Committee on Automation: Judith M. Brugger, Information Technology Librarian, Cornell University; Michael Kaplan, Chair of the Committee and Head of Database Management & Coordinator for OCLC/RLIN Operations, Harvard College Library; and Joseph A. Kiegel, Acting Head, Cataloging Division, University of Washington and were prepared as part of the OMS Collaborative Research/Writing Program.

SPEC Flyer (ISSN 0160 3582) ©1996 by the ASSOCIATION OF RESEARCH LIBRARIES, OFFICE OF MANAGEMENT SERVICES. OMS grants blanket permission to reproduce this information for educational use as long as complete attribution is given. For commercial use, requests should be sent to the ARL Publications Department, Association of Research Libraries, 21 Dupont Circle, Washington, DC 20036. SPEC Kits and Flyers are available by subscription and single issue.

SPEC

SYSTEMS AND PROCEDURES EXCHANGE CENTER

Technical Services Workstations

A SPEC Kit compiled by

The Program for Cooperative Cataloging
Standing Committee on Automation

Judith M. Brugger, *Cornell University*
Michael Kaplan, Chair, *Harvard University*
Joseph A. Kiegel, *University of Washington*

February 1996

Editor....Laura A. Rounds, OMS Program Officer for Information Services
Production Assistant....Marianne Seales, Program Assistant

SPEC Kits are published by the
ASSOCIATION OF RESEARCH LIBRARIES
OFFICE OF MANAGEMENT SERVICES
21 Dupont Circle, NW
Washington, DC 20036
(202) 296-8656 Fax (202) 872-0884

ISSN# 0160 3582

© Copyright 1996

The papers in this compilation are copyrighted by their authors. The authors have granted permission to reproduce and distribute copies of these works for nonprofit educational or library purposes, provided that copies are distributed at or below cost, and that the author, source, and copyright notice are included on each copy. This permission is in addition to rights of reproduction granted under Sections 107, 108, and other provisions of the U.S. Copyright Act.

∞ *The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Performance of Paper for Printed Library Materials, ANSI Z39.48-199X.*

ASSOCIATION OF RESEARCH LIBRARIES OFFICE OF MANAGEMENT SERVICES

SYSTEMS AND PROCEDURES EXCHANGE CENTER: SUPPORTING EFFECTIVE LIBRARY MANAGEMENT FOR OVER TWENTY YEARS

Committed to assisting research and academic libraries in the continuous improvement of management systems, OMS has worked with its constituents since 1970 to seek the best practices for meeting the needs of users. The OMS Information Services Program maintains an active publications program best known for its Systems and Procedures Exchange Center (SPEC) Kits. Through the OMS Collaborative Research/Writing Program, librarians work with OMS staff in joint research and writing projects. Participants and staff work together in survey design, writing, and editing publications that provide valuable insights and management perspectives on emerging trends, issues, and concerns of the academic and research library community. Originally established as an information source for ARL member libraries, the SPEC program has grown to serve the needs of the library community world-wide.

WHAT ARE SPEC KITS AND FLYERS?

Published ten times per year, SPEC Kits and Flyers contain the most valuable, up-to-date information on the latest issues of concern to libraries and librarians today. SPEC Kits and Flyers are the result of a program of surveys on a variety of topics related to current practice and management of library programs in the ARL membership. The SPEC Flyer is a two-page summary of the status of a current area of interest. It comments on the present situation, reports on the results of an ARL membership survey, and forecasts future trends. The SPEC Kit contains the SPEC Flyer and the best representative supporting documentation from the survey in the form of policy statements, handbooks, manuals, cost studies, user studies, procedure statements, planning materials, and issue summaries. A valuable feature of each SPEC Kit is its selected reading list containing the most current literature available on the topic for further study.

SUBSCRIBE TO SPEC KITS

Subscribers tell us that the information contained in SPEC Kits and Flyers is valuable to a variety of users, both inside and outside the library. The SPEC Flyer is an inexpensive current awareness tool for keeping up-to-date on important library management topics. The documentation found in SPEC Kits is a good point of departure for research and problem solving. SPEC Kits and Flyers lend immediate authority to proposals and aid in setting standards for designing programs or writing procedure statements. SPEC Kits function as an important reference tool for library administrators, staff, students, and professionals in allied disciplines who may not have access to this kind of information.

SPEC Kits and Flyers can be ordered directly from the ARL Office of Management Services or through your library vendor or subscription agent. For more information contact the ARL Publications Department at (202) 296-8656, or fax (202) 872-0884. Information on this and other OMS products and services can be found on the ARL Gopher <URL:gopher://arl.cni.org> and World Wide Web <URL:http://arl.cni.org>.

SPEC

SYSTEMS AND PROCEDURES EXCHANGE CENTER

Kit 213

Technical Services Workstations
February 1996

Table of Contents

SURVEY RESULTS 3

EQUIPMENT UPGRADE PROPOSAL

The following are actual proposals and plans for upgrading computing devices within an institution. Because of their detailed nature, all references to the institution's name have been removed.

Proposed Technical Services Computer Equipment Plan 15
Technical Services Computer Equipment Plan: A Proposal 25

TRAINING DOCUMENTS

Cornell University

Standard Workstation Configuration 37
Technical Services Training Outline 38
Virtual Computer Break is Dead 39
Introduction to Your Workstation 41
Customizing Your Desktop 44
Using McGill 46
Using RLIN (telnet) and RLIN-for-Windows 49

Stanford University

NOTIS for Windows Documentation 51
Windows Basics 52
Getting to Your Email 53
Internet Tools 55
Printing 57
NOTIS for Windows 59
Swap-Out FAQs 61
NOTIS at Stanford (keyboard) 63

ASSOCIATION OF RESEARCH LIBRARIES OFFICE OF MANAGEMENT SERVICES

Yale University
A Short Networking Glossary 65
Welcome to Your Workstation 67
Set-up Checklist for the Yale Library Windows Workstation 69
Essential Configuration Details for the Yale Library Windows Workstation 71
Sample McGill Session 72
Terminal to Pentium Conversion Procedures 73
Workstation Software 91

ERGONOMICS

Harvard University
Ergonomics Program and Policies 95

University of New Mexico
Checklist for Assessing Computer Workstations 131
Computer Stretches and Exercises 135

University of Texas–Austin
About the Ergonomics Task Force 139
Ergonomics Guidelines 141
Ergonomics Task Force 151

University of Washington
Exercise Packet 153

SELECTED READINGS 177

SURVEY RESULTS

From August to October, 1995, the Program for Cooperative Cataloging's Standing Committee on Automation surveyed ARL libraries about their use of workstations in technical services departments. The Task Group has been encouraging the use of workstations that:

A. Provide as many cataloging tools as possible (e.g., AACR2, LCRIs, SCM, LCSH, code lists, LC classification schedules, Dewey) in as many automated forms as possible (e.g., "pop-up" files, CD-ROM, gopher files, online files).
B. Have word-processing capabilities (e.g., cut/paste).
C. Are capable of windowing (e.g., between authority and bibliographic records) and multi-tasking.
D. Provide access to multiple databases and resource files.
E. Are capable of cataloger-customized macros.
F. Provide templates or prompt screens with constant data.

Of the 119 ARL member institutions 60 (50%) responded to the PCC Standing Committee on Automation's 1995 TSW survey. Of these, 15 (25%) indicated that although they had not yet installed any Technical Services Workstations (TSWs), they were planning to. Six others (10%) indicated that they had not yet made any plans to install workstations. TSWs were already in use at 39 institutions (65%). Although our first impulse was to include the planning data along with the other 'yes' responses, it soon became clear that the planning data could not always be construed in the same way as the after-the-fact data, so planning data is sometimes excluded from the following totals. Moreover, not all respondents answered all questions, so sometimes totals appear to be incomplete.

One way of describing the institutions that said they were using TSWs is to look at the number of titles that are reported cataloged on a yearly basis. Of the 37 TSW-using institutions that provided this figure, the low was 17,322 and the high was 195,460. The average was 65,073. After excluding the 6 institutions that cataloged more than 100,000 titles per annum, the average number of titles cataloged was 50,173. See Table 1.

Of the 21 institutions that were not yet using TSWs, the low figure for titles cataloged was comparable to that of the first group: 17,224. The high for this group, however was only 50,000. The average was 31,478. Not all non-TSW institutions reported this figure. See Table 2.

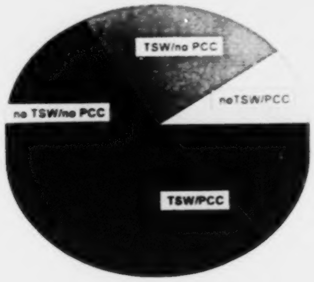
Another way to look at the institutions using TSWs is to count the number of technical services staff members in acquisitions and cataloging positions. When calculating an average, we again excluded staff counts from the 5 institutions reporting more than 100 staff members to arrive at an average of 50.5 staff members in acquisitions and cataloging units at TSW-using institutions. See Table 3.

Of the 21 institutions that were not yet using TSWs, 16 reported their staff totals. The lowest total number of acquisitions and cataloging staff members was 24, the highest was 65 and the average was 41. See Table 4.

For those institutions that have already installed TSWs, it is interesting to compare the number of TSWs in use to the total number of acquisitions and cataloging staff. The most partial implementation was 10%. Thirty-four percent of the responding TSW-using institutions furnished TSWs for 100% of their acquisitions and cataloging staff members. See Table 5.

It is instructive to note that of 39 institutions with TSWs, 29 (74%) are members of the Program for Cooperative Cataloging (PCC), whereas of the 21 institutions that have not yet installed any TSWs, 8 (38%) are PCC members.

PERCENTAGES OF ALL RESPONDING INSTITUTIONS BY PCC MEMBERSHIP AND TSW USE



48%	Institutions that use TSWs and contribute PCC program records
13%	Institutions that do not use TSWs and do contribute PCC program records
17%	Institutions that use TSWs and do not contribute PCC program records
22%	Institutions that do not use TSWs and do not contribute PCC program records

ARL publishes statistics ranking university libraries from 1 (highest) to 108 (lowest) in several categories. National and special libraries that are members of ARL are not ranked in these lists. We cite some data from the most recent published ARL statistics (1993/1994) in order to situate university institutions responding in August-October, 1995, within the larger context of ARL university institutions as regards volumes added per year, total library expenditures, and total staff (FTE). For those institutions that were already using TSWs in August-October, 1995, the average ranking for volumes added in 1993/1994 was 44. The average ranking for total expenditures was 40. The average ranking for total staff was 41. See Table 6.

For institutions that were not yet using TSWs, the average ranking for volumes added was 68; the average ranking for total expenditures was 74; and the average ranking for total staff was 71. See Table 7.

RESPONSES TO SPECIFIC SURVEY QUESTIONS

HARDWARE:

What is the make and model of your TSW?

The brand names cited in the survey vary widely. Major vendors such as IBM, Compaq, Dell and others are used, as well as local suppliers. Dell was the most frequently mentioned brand.

For IBM-compatible machines, 486s are the most common processor (53%), while Pentiums show a strong second (35%) and far outnumber 386s (9%). Only two institutions report 286 machines. In terms of CPU speed, 60 MH and above predominate.

Macintosh use was also reported. One ARL institution (2%) reports using it exclusively and five others (10%) have a mix of Macintoshes and PCs. The PowerMac 6100 and 7100 are common for these institutions.

For current purchases, how much RAM are you buying?

Range: 4 MB to 24 MB

More than half of the institutions (59%) buy 16 MB, while another third (31%) buy 8 MB. The high and low ends of the range are represented by the remaining institutions.

For the Macintosh, the range reported is from 10 to 24 MB.

For current purchases, how large of a hard drive are you buying?

Range: 100 MB to 1.2 GB

While the distribution is wide for PCs, a typical hard drive is 540 MB.

100-299 MB	10%
300-399 MB	22%
400-499 MB	12%
500-599 MB	40%
600-999 MB	8%
1 GB +	8%

For the Macintosh, the range is 75-700 MB.

SYSTEM SOFTWARE:

What GUI do you use and what is the version number?

Of 58 implementations, 47 (81%) are Windows, 6 (10%) the Macintosh interface, 1 DesqView, 2 DOS and 2 other. Seven (14%) institutions report multiple interfaces, e.g. Windows and the Mac. Ninety-four percent of the institutions use Windows on at least some of their TSWs.

Do you have a LAN or LANs?

Eighty-four percent of reporting institutions have a LAN, and 29% of these have more than one. Eight institutions report two types of LANs and four others have three types.

For IBM-compatible machines, Novell (58%) predominates, with Windows for Work Groups (15%) second. Others include OnNet (Sirsi), Windows NT, Banyon and DEC Pathworks.

All of the Macintosh computers are on AppleTalk.

LOCAL LIBRARY SYSTEM VENDOR:

Who is your local library system vendor?

Of this sample of ARL libraries, NOTIS is the leading system, followed by Innovative, Geac, Ameritech, CARL and Sirsi. Some institutions report a mixed environment and each vendor has been counted in these cases.

NOTIS	27%
Innovative Interfaces	24%
Geac	13%
Ameritech	9%
In-House	9%
CARL	7%
Sirsi	7%
DRA	2%
VTLS	2%

TSW FUNCTIONALITY:

Which of the following capabilities and resources does your TSW provide?

The functionality on TSWs can be ranked by the frequency with which it is available, from universal to uncommon. A small set of functions is implemented on all or nearly all TSWs, and then a broader range of functionality is implemented to a lesser degree, based on institutional and individual user needs. The types of functionality are listed below with their frequency within the survey responses.

Universal

100%	E-mail
100%	FTP

Very Common

98%	Telnet
96%	OPAC access software
96%	Word processing
94%	World Wide Web browser
86%	Gopher software

Common

76%	Spreadsheet
65%	LC MARC authority records
63%	LC MARC bibliographic records
57%	Calendars
55%	Subscription or fulfillment agent databases
51%	Database programs
51%	LC Cataloger's Desktop
41%	OPAC macros

Not Common

29%	SGML markup software
27%	CWIS platform
25%	MARC code lists (not Cataloger's Desktop)
20%	Flowchart software
12%	Software updating service (version control client)
10%	LCRIs (not Cataloger's Desktop)

Does your staff use a controlled, standard configuration or do they customize their individual workstations?

A standardized configuration is used by 26% of respondents with TSWs and a customized one is used by 39%. The remaining 35% of the institutions report using both standard and customized configurations.

What software do you use to access your local catalog?

A very wide variety of software is used to access the local catalog. No single package comes close to dominating this category. However, McGill TCP3270 for Windows (15 responses), OCLC Passport (13 responses), WinQVT (7 responses) and Cornell TN3270 (5 responses) are popular ones.

The following programs are also used: Brown TN3270, CARLTerm, Chameleon, Comet, Clarkson Telnet, Geac Geo/Pac, Geac Terminal Emulator, Host Presenter, Irmalon for Windows, Kermit, LC BWS emulator, MacMainFrame, McGill Net3270, NCSA/BYU Telnet for Mac, NCSA CUTCP, NCSA Telnet, OCLC Gateway, OnNet, Pro-Comm+, RLIN for Windows, Samson, SmartTerm, WTNVT, YaleTerm (YTerm).

What method or methods do you primarily use to bring records into the system?

A large majority (73%) of respondents import records using more than one method.

	% of 124 responses	% of 52 institutions
OCLC Export	28%	67%
Tape Load	22%	52%
FTPed Load	18%	42%
Local Resource File	9%	21%
Local Program	7%	17%
RLIN Pass	6%	15%
RLIN Put	4%	10%
Other	6%	13%

Please indicate whether you display the ALA character set.

The ability to use the TSW to display the ALA character set (to the extent required by the institution) is fairly widespread. It is most common when viewing the bibliographic utility (80%), next in technical mode in the local system (71%) and least common in the OPAC (53%). Virtually all of the institutions that cannot display the character set in these functions wish to do so.

Under what conditions can you print the ALA character set?

Twenty percent of responding institutions are able to print the ALA character set under all conditions. The majority (60%) can print it only when using certain software or when the printer itself is capable of it. The remaining institutions (20%) cannot print the ALA character set at all.

Do you network printers, provide individual printers or both?

A majority (66%) of respondents provide access to printing both over the network and with individual printers. A substantial minority (26%) use only individual printers, while it is relatively rare to access printing only over the network (8%).

What are the editing capabilities of your TSW?

The following are the percentages of respondents with these editing capabilities:

Cut/paste	95%
Templates (not empty work forms)	45%
Macros	
Hot keys	76%
Embedded commands	52%
Nested	21%
Other	12%

Does your TSW have any other significant capabilities that you would like to mention?

Substantial programming effort has been directed toward the development of two sets of tools to assist the cataloger in the creation and manipulation of authority and bibliographic records. The capabilities afforded by this "cataloger's toolkit" go beyond those encompassed by the term "macro." For example:

- Creating full authority records from headings in bibliographic records and convert ASCII text into MARC variable fields.
- Data validation against pre-defined tables.
- Validation of records throughout the cataloging process, such as field relationships, fixed field data and variable field data.
- Authority validation for names, series and subjects.
- System supported basic name and series authority record creation from the bibliographic records.
- Global update of name and series access points when the name or series is changed in an authority record.
- Cataloging documentation marked up in HTML and mounted on a local Web server.
- Full MARC tables and authority control and maintenance.
- Four simultaneous Internet sessions.

- Running multiple, simultaneous sessions.
- Full access to all Library electronic resources.
- NewKey (macro) program.

ERGONOMIC FACTORS:

What have you done to minimize physical problems or injuries associated with workstation use?

	Number	Percent
Purchased footrests	38	63
Purchased adjustable chairs	51	85
Purchased computer tables	41	68
Purchased document stands/ or special lighting	32	53
Purchased ergonomic keyboards	13	22
Purchased articulated mouse trays	9	15
Adjusted schedules	22	37
Rearranged furniture	43	72
Circulated literature...about posture	45	75
Circulated literature...about exercise	36	60
Other (most commonly cited was the purchase of wrist rests)	21	35

Have you or any of your staff experienced incidents of repetitive stress injury, back strain, eye strain, or other injuries associated with TSW use?

Of the 47 institutions that responded to this question, 38 (81%) said that they had experienced incidents of repetitive stress injury, back strain, eye strain, or other injuries associated with TSW use. Nine (19%) said they had not. Of the 38, one said that they also experienced these problems with terminals, and one said that they had not experienced any problems since the institution of a formal ergonomics program. The level of injuries reported ranged from "nothing major, some back strain" to reports of surgeries and resignations.

COMPARISON WITH 1994 SURVEY

In August, 1994, the Cooperative Cataloging Council's Automation Task Group conducted an e-mail survey of U.S. and Canadian libraries on the subject of Technical Services Workstations. Twenty institutions responded, of which 55% were ARL libraries.

HARDWARE:

A sharp increase in the level of hardware in use can be seen over the course of only one year. In 1994, the low-end CPU reported was an 8088, with 486s common but few Pentium machines. In 1995, the low end was a 286 and Pentiums were quite common. The typical amount of RAM increased from 8 MB to 16 MB and the typical hard disk moved from 240 MB to 540 MB. No Macintosh use was reported in the first survey, but the second survey found Macintoshes at 12% of responding ARL institutions.

SYSTEM SOFTWARE:

Windows as a graphical user interface and Novell as networking software predominated in both surveys. The telnet software used to access local catalogs was all over the board in both surveys, although a trend toward Windows-based packages could be seen in 1995.

TSW FUNCTIONALITY:

The most frequent categories in 1994–E-mail, FTP, Telnet, OPAC access software and word processing–remained the same in 1995 and were joined by World Wide Web browsers and Gopher software. In terms of editing capabilities, cut/paste was more widespread in 1995.

ERGONOMIC FACTORS:

Questions about ergonomic factors were not asked in the 1994 survey.

RESPONDING INSTITUTIONS

University of Alabama
Edmonton Alberta
University of Arizona
Brigham Young University
Brown University
University of California, Riverside
University of California, San Diego
University of California, Santa Barbara
Case Western Reserve University
University of Colorado
Columbia University
Cornell University
Emory University
University of Florida
Georgia Institute of Technology
University of Guelph
Harvard University
University of Hawaii
University of Houston
Iowa State University
Johns Hopkins University
Library of Congress
University of Maryland
Massachusetts Institute of Technology
Michigan State University
University of Missouri
National Agricultural Library
National Library of Medicine
University of Nebraska–Lincoln
University of New Mexico
New York University
North Carolina State University
Northwestern University
University of Notre Dame
Ohio State University
Pennsylvania State University
Princeton University
Purdue University
Rice University
University of Rochester
University of Saskatchewan
Smithsonian Institution
University of South Carolina
Stanford University
State University of New York at Albany
State University of New York at Buffalo
Syracuse University
Temple University
University of Tennessee
University of Texas
Vanderbilt University
Virginia Polytechnic Institute & State University
University of Washington
Washington University
University of Waterloo
Wayne State University
University of Wisconsin
Yale University
York University

SPEC

SYSTEMS AND PROCEDURES EXCHANGE CENTER

Kit 213

Technical Services Workstations
February 1996

ERRATA

The following tables were inadvertantly ommitted from the Survey Results Section of SPEC Kit #213.

Institution	Titles
BYU	54,884
Calif-San Diego	62,663
Calif-Santa Barbara	56,000
Case Western	16,831
Columbia	12,1300
Cornell	105,264
Emory	28,951
Florida	49,907
Georgia Tech	22,297
Harvard	155,000
Hawaii	46,765
Houston	35,000
Johns Hopkins	34,916
Library of Congress	195,460
Maryland	78,152
Michigan	66,230
NAL	17,322
NC State	37,921
NLM	22,385
Northwestern	32,285
NYU	57,605
Ohio State	65,432
Penn State	88,595
Princeton	75,000
Rice	31,915
Southern California	61,000
Stanford	80,000
SUNY-Buffalo	90,000
Syracuse	59,350
Tennessee	25,419
Texas	175,299
Vanderbilt	34,218
Washington	72,000
Washington U-St Louis	25,435
Wayne State	39,072
Wisconsin	87,816
Yale	100,000

TABLE 1.
TSW INSTITUTIONS
TOTAL CATALOGED (PER ANNUM)

Institution	Titles
Alabama	36,000
Alberta	33,000
Arizona	50,000
Brown	33,312
Cal-Riverside	26,337
Colorado	27,276
Guelph	29,642
Missouri	21,369
Nebraska	28,000
New Mexico	30,111
Notre Dame	43,227
Purdue	24,367
Rochester	17,224
Smithsonian	15,831
SUNY-Albany	18,000
Temple	26,000
unnamed	50,000
Virginia Tech	39,264
York	49,127

TABLE 2.
NON-TSW INSTITUTIONS
TOTAL CATALOGED (PER ANNUM)

Institution	Acq. and Cat. staff
BYU	49
Calif-San Diego	99
Calif-Santa Barb	45
Case Western	13
Columbia	80
Cornell	107
Emory	26
Georgia Tech	24
Harvard	230
Hawaii	36
Houston	21
Iowa	52
Johns Hopkins	38
Library of Congress	822
Maryland	50
Michigan	55
NAL	60
NC State	61
NLM	81
Northwestern	54
NYU	59
Ohio State	66
Penn State	74
Princeton	84
Rice	27
Saskatchewan	47
Southern Cal	44
Stanford	87
SUNY-Buffalo	58
Syracuse	41
Tennessee	41
Texas	101
Vanderbilt	35
Washington	68
Washington U-St Louis	20
Wayne State	18
Wisconsin	52
Yale	160

TABLE 3.
TSW INSTITUTIONS
ACQUISITIONS AND CATALOGING STAFF

Institution	Acq. and Cat. staff
Alabama	29
Arizona	65
Brown	37
Cal-Riverside	34
Colorado	28
MIT	41
Nebraska	65
New Mexico	40
Notre Dame	51
Purdue	33
Rochester	24
Smithsonian	29
SUNY-Albany	28
Temple	38
unnamed	65
York	52

TABLE 4.
NON-TSW INSTITUTIONS
ACQUISITIONS AND CATALOGING STAFF

Institution	Percent
Emory	100
Houston	100
Maryland	100
NLM	100
NYU	100
Southern Cal.	100
Stanford	100
Syracuse	100
Vanderbilt	100
Washington	100
Wayne State	100
Wisconsin	100
BYU	100
Saskatchewan	98
NC State	98
Georgia Tech	96
Columbia	95
Michigan	95
Cornell	93
Ohio State	92
Case Western	92
Rice	85
Johns Hopkins	85
Yale	81
Tennessee	80
Library of Congress	75
Northwestern	72
Harvard	70
Princeton	69
Iowa State	67
Calif-San Diego	66
NAL	58
Washington U-St Louis	50
Texas	44
Calif-Santa Barb	40
Penn State	35
Hawaii	17
SUNY-Buffalo	10

TABLE 5.
ACQUISITIONS AND CATALOGING
STAFF WITH TSWs

Institution	Vols added	Expenditures	FTE
BYU	61	59	47
Brown	25	56	55
Calif-San Diego	39	38	36
Calif-Santa Barb	102	67	72
Case Western	104	96	100
Columbia	9	8	7
Cornell Univ	14	9	8
Emory	71	25	60
Florida	51	34	24
Georgia Tech	100	108	108
Harvard	1	1	1
Hawaii	54	63	73
Houston	86	82	85
Iowa S. U.	33	37	44
Johns Hopkins	68	27	43
Maryland	32	41	16
Michigan	7	5	9
NC State	28	21	20
Northwestern	42	33	26
NYU	40	12	17
Ohio State	24	24	22
Penn State	15	13	11
Princeton	23	14	23
Rice	93	90	107
Saskatchewan	67	105	103
Southern Cal	47	28	38
Stanford	8	2	10
SUNY-Buffalo	34	55	53
Syracuse	77	83	62
Tennessee	81	71	58
Texas	3	17	4
Vanderbilt	69	52	49
Washington	12	15	14
Washington U. of St Louis	2	35	45
Wayne State	38	53	57
Wisconsin	17	10	12
Yale	5	4	6

TABLE 6.
ARL RANKINGS FOR VOLUMES ADDED EXPENDITURES AND FTE FOR TSW INSTITUTIONS

Institution	Vols added	Expenditures	FTE
Alabama	88	94	86
Alberta	43	36	33
Arizona State	30	30	29
Brown	25	56	55
Cal-Riverside	107	106	104
Colorado State	74	104	105
Guelph	82	107	105
MIT	84	64	75
Missouri	79	84	65
Nebraska	21	86	77
New Mexico	75	43	35
Notre Dame	50	81	88
Purdue	58	76	52
Rochester	105	79	84
SUNY-Albany	91	101	100
Temple	95	70	71
Virginia Tech	18	31	32
Waterloo	108	97	95
York	62	60	66

TABLE 7.
ARL RANKINGS FOR VOLUMES, ADDED EXPENDITURES, AND FTE FOR NON-TSW INSTITUTIONS

EQUIPMENT UPGRADE PROPOSAL

University Libraries: *Technical Services Department*

To: The Librarian
Date: January 1, 1994
From: The Head of Technical Services
Subject: Proposed Technical Services computer equipment plan

Attached is a proposal for additional and upgraded/replacement computer equipment for Technical Services. It outlines what, in my estimation, our priorities should be in terms of modernizing the equipment with which we perform our basic technical services operations, and where we should concentrate the allocation of additional equipment. In submitting this proposal I am prompted not so much by immediate necessity, as by the knowledge that our existing stock of aging and outmoded equipment will not provide an adequate platform upon which to build the next generation library management system (almost certainly to be integrated), and precludes us from taking advantage of worthwhile existing technological developments (described below) which predicate more communications access and better hardware than we currently possess. Beginning a phased modernization of Technical Services equipment today, will put us in a stronger position and give us more options tomorrow.

In brief, there are three main goals encompassed in the accompanying proposal:

- Acquisition of additional personal computing equipment and communications access for Technical Services management staff;
- Acquisition of upgraded/replacement hardware to enable the Department to incorporate currently available new technical options (e.g., electronic ordering) into our operations and to follow through on the transition of cataloging functions from RLIN to the local system;
- Distribution of existing hardware, and acquisition of some additional non-upgraded hardware and ergonomic furniture, to provide individual workstations for staff whose responsibilities require intensive computer use (i.e., more than 1/2 of their working day).

I have tried to provide as complete and accurate information on equipment costs as possible. Since changes in computer hardware prices will continue to trend downward, the estimated costs are, if anything, on the high side. However, costs for wiring and associated labor expenses, are not included.

The proposal envisions three basic workstation types: a workstation utilizing existing equipment; a workstation for line staff, based on the prototype workstations we have acquired for experimentation with NOTIS input-edit; and a "Manager's Workstation," with capabilities similar to the NOTIS workstation, but with more power, memory and disk capacity. The Line Workstation and the Manager's Workstation each will offer multi-database access (i.e., communication with NOTIS and RLIN, and, in some cases, Geac). I have grouped my recommendations into "packages" which address the needs of specific units or groups of staff in the context of the three goals just described. They can be considered (and funded) separately with the overall proposal lending itself to implementation in stages over a multi-year period. At the begining of the proposal, for convenience of reference and discussion, I have included a summary which gives a brief global view of the entire proposal.

Before going into the reasons for an equipment upgrade, I think it would be helpful if I first describe the different primary types of existing computer equipment in Technical Services. They are as follows:

Geac-Geac Terminals

These are dedicated (i.e., "dumb" single-function) terminals originally manufactured by Geac. These terminals are specially programmed to communicate directly with the Geac 9000. They are no longer in production and must be replaced with either Wyse terminals or an IBM PC or PC-type clone. There are currently 28 of these terminals in TSD (18 of them in Circulation and Reserve). Five are slated for replacement by Geac-Wyse terminals.

Geac-Wyse Terminals

These are dedicated (i.e., "dumb" single-function) terminals of general manufacture. Since this is "off-the-shelf" hardware it needs an additional device to communicate with the Geac 9000. This additional device is a TCS controller, which is an IBM style PC programmed to handle such communication for satellite Wyse terminals or other PCs networked to it. Each TCS controller can service a maximum of 8 satellite terminals or PCs. They currently cost $5,500 a piece. There are 25 Wyse terminals in TSD with five more to be added shortly as noted above. Level of performance of the Wyse/TCS configuration is inferior to the Geac-Geac direct connection configuration.

Older PCs

The majority of the personal computers in the Department (23 out of 42) are older IBM XT or AT class (Intel 286 processors or earlier). These models have not been in production for the past five years or longer. They antedate the development of processors and lack the processing power, memory and disk capacity necessary to perform "state-of the art" functions. They are used almost exclusively as RLIN dedicated (single-function) terminals for order searching, cataloging and catalog editing, though some, those which have been allocated to managers, have been equipped with word-processors. Six older PCs have been equipped with a special board, called an LTS card, designed and manufactured by Geac, which enables the PC to function like the old Geac-Geac dedicated terminals, i.e., they can communicate directly with the Geac 9000, instead of needing to be linked through a TCS controller. Geac has not, and does not intend, to upgrade the design of this LTS card to work with newer model (post AT/286 class) computers. In any case, each LTS card costs $1,500, which makes it twice as expensive as a means of replacing worn out Geac-Geac dedicated terminals as the Wyse-TCS configuration.

Lower-end Newer-model PCs

We have eight 386 class IBM-type computers, three IBM/PS-2 model computers which run an early IBM-designed version of the windows interface, and two Macintosh SEs. The 386 class is the lowest class capable of running the newer windows-oriented operating systems and applications. Neither the 386, the IBM/PS-2 nor the Mac SE is capable of performing NOTIS cataloging input-edit at a level of functionality better than or equal to what RLIN provides. The 386s might be capable of handling some of the up-to-date Technical Services workstation operations (noted below) if provided substantial upgrades in memory and disk capacity. These workstations are allocated as follows:

Four of the 386s are allocated as dedicated RLIN terminals for Near East language cataloging and recon, as RLIN vernacular language software requires a 386 processor or better. Two low-end "stripped down" 386s are currently in service as dedicated RLIN terminals (other than NE terminals noted previously). One better model 386 is assigned to the Reserve/General Periodicals Librarian. One better model 386 is allocated as a general purpose TSD workstation (noted below).

The heads of Cataloging and DBMS have two of the old IBM/PS-2s. The third IBM/PS-2 is assigned up as a dedicated NOTIS GTO terminal, for passing records from RLIN to NOTIS.

One Macintosh SE is currently in service as the main processing computer for Near East acquisitions (Neac). It will shortly be de-commissioned as these functions are transferred to Geac. One Macintosh SE is an all-purpose TSD terminal. This Mac is now used primarily by Reserve staff to make Reserve folder labels. Since the TSD secretaries can now do graphics-oriented computing on the NeXT, since [Jane Doe 1] has her own Macintosh to do floor plans and stack guides, and since rabbinic cataloging has been moved to RLIN, the Macintosh now gets comparatively little use.

I have recently recommended to [John Doe 1] that it be reassigned (if repairable; it has had recurring technical problems).

Higher-end Newer-model PCs

Our stock of PCs which would be capable of handling current and projected applications and communications consists of two 486 class computers assigned to the heads of Order and Circulation Division, two Macintosh Centris class workstations assigned to the heads of NETS and Shelving/Annexes, and two 486 class experimental NOTIS catalog input-edit workstations.

We have reached a point where the personal computer has become the central tool of a majority of the staff of Technical Services. All of the major aspects of technical services' processing became automated through the first half of the 1980's. This automation was based primarily upon dedicated equipment (dumb terminals), with circumscribed functionality to access either RLIN or Geac, organized into shared "walk-up" workstations, which at that time, was the only cost effective way to provide such service. The average staff member of Technical Services spent a fraction of his/her workday at the terminal, and the personal (micro) computer was still little more than a glorified typewriter in terms of its capabilities.

****

In the mid-1980's the first round of equipment replacements took place, with custom-built dedicated Geac terminals giving way to "off-the-shelf," but similarly dedicated, Wyse terminals, and custom-built RLIN dedicated terminals being replaced by IBM PC clones, which at the time were fairly high end equipment, but are now severely outmoded in relation to current system capabilities and requirements.

Computing capabilities and needs of the mid-1990's are very different than those of ten or more years ago. **Workstation functionality has continuously expanded, becoming more focused on the personal computer with its attendant flexibility to serve more than one task or access information from more than one source.** The following are examples of some current technical initiatives affecting technical services operations:

Cataloging is moving from the national utilities to local systems. It is the expressed intention of RLG to cease developing the roman-language capabilities of its technical processing system further, other than to facilitate communications with local systems. Software for a prototype production system, Etherterm, which does this by allowing local system-to-RLIN communications for input-edit via the Internet, is already in release, with record import-export via FTP currently being tested.

We are now receiving LC subject authority records online via ftp to load into our NOTIS system.

In Acquisitions, three of our largest approval vendors have made their databases available to access via the Internet, which allows us to search for and make modifications to what they are planning to send us. This greatly improves predictability of the plans and thus greatly reduces book returns. A fourth vendor has announced similar plans for the Spring of 1994.

All of our major serial subscription agents provide us, free of charge, with invoice tapes for loading into Geac. At least one agent (Faxon) has stated that it plans to begin charging for those tapes in 1995, after which free invoice data will only be supplied via FTP.

We currently have a small-scale direct electronic ordering operation in place with one U.S. monograph vendor and our British agent. Other European and domestic agents are preparing similar capabilities. As of this moment, had we the equipment, we could potentially apply electronic ordering to 8,000 orders annually, with the concomitant savings in paper, postage, handling and labor, and a significantly improved turnaround time for receiving the material ordered. We can expect electronic ordering activity to grow rapidly in the near term.

Much of the data in the serials pricing database, designed and built by [Jane Doe 2] and [John Doe 2], was derived by accessing agent records via the Internet and downloading them into the database. This database is an example of the type of information processing state-of-the-art equipment makes possible, which cannot be garnered in any other way, and which serves to support crucial management decision-making.

With our acquisitions and circulation systems in the twilight of their effective lives, it is necessary to think and plan for the next generation, possibly integrated, system. The current generation of large library management systems, such as NOTIS *Horizon*, are predicated on personal micro-computing hardware and now generally incorporate Windows-type interfaces.

All of these developments assume PC equipment with adequate power and communications capabilities. Excluding the NeXT workstations of the Department head and the Departmental secretaries, and the PCs dedicated to prebindery operations (which are the property of our binding agent), the Department has 95 computer workstations, of which 53 are dumb Geac terminals and 42 are PCs. As noted above, of the PCs, only a few are capable of running a Windows type graphical user interface, and even fewer have the power to adequately perform the tasks described in the examples above.

Those examples give a glimpse at the changes which are taking place in the technical services environment most of which are being driven by forces outside our control or influence. **Going along with those developments is the revolution in computing in pursuit and support of personal productivity, and as a means by which communication takes place both within and without the Library**. Word-processors, databases, spreadsheets and communications programs are becoming necessary tools-of-the-trade for the professional in any occupation. As demonstrated by the recent establishment of a Library listserver, online network access to shared information of importance to professional staff has moved from being a novelty to a necessity. Communication between library professionals over the Internet concerning profession and work related matters is growing at a blistering pace. Professional staff, especially management staff, who do not have continuous ready access to such sources of information risk being effectively "disenfranchised" as professional librarians.

As further illustration of this, we set up a shared PC workstation at a central location in the department about two years ago, a 386 class PC with Windows capability, a standard suite of software, and a LAN connection. This is still the only relatively full-featured personal computer accessible to 29 professional staff (including six professional managers); there are now often waiting lines to use it. It has become more important than ever to stay current with technological developments affecting technical services operations, such as those described on the previous page.

To accomplish this it is necessary that we begin to acquire equipment with sufficient power and functionality to allow us to pursue our mission and to develop our basic operations in the new and unfolding technological environment. It is likewise critical that we have enough of the right equipment for staff, especially management staff, to have ready access to current and projected technology, and workstations upon which they can develop the most appropriate solutions to incorporate this technology into the routine of the Department and that of the units for which they are responsible. A key element in this is moving our communications from a chiefly dedicated single-function capability to a network-based multi-function capability. This requires a substantial expansion of ethernet access and the acquisition of hardware with sufficient power and functionality to take advantage of it.

Along with an increase in computing capability will inevitably come the need for staff to spend yet more of their time at online tasks. Already roughly 60% of the staff of the Department (ca. 80 staff) work at a terminal for more than 1/2 their workday. In most Order Division units, the proportion of the workday spent at a terminal is 3/4, and in some cases greater. The Technical Services managers and I feel that it is important that we begin to move in the direction of providing individual workstations supplied with necessary ergonomic furniture, for full-time staff whose responsibilities require intensive and prolonged computer use. I expect that in so doing we would achieve a more efficient and more work conducive physical environment, ideally reclaiming some space now taken up by personally assigned desks coexisting with shared computer workstations. We already have 95 workstations shared by roughly 125 staff. It is now common, in a number of units, to have a use ratio, staff to computer, of 3:2 or less.

A subsidiary benefit of individual workstations would be the elimination of much of the constant moving around of staff, with its attendant disruption, which would most certainly contribute to efficiency, productivity and morale. **Individual workstations would also mitigate physical problems resulting from heavy computer use, by providing an individually customizable terminal environment with greater adherence to individual physical needs.**

With the ever increasing dependence on computers in the performance of all of our tasks, as noted above, has come increasing occurrences of computer related injuries and disabilities. The recent purchase of better furniture and accessories, particularly chairs, has helped a lot. However, it is a fact of life that many staff will not take the necessary time or trouble to adjust the height and angle of chair, screen and keyboard each time they sit down at a terminal, all of which are required for healthy terminal use. It is a troublesome development that it will fall to the supervisory staff to insure that all these requirements are met for each terminal user. Workstations, which can be permanently configured to an individual's distinctive physical requirements, are the only practical way that we can insure adequate health and safety measures are being applied for heavy computer users, not to mention the saving of wear and tear on equipment which is being constantly adjusted.

Not all staff require individual workstations, and not all of those who do require them need new equipment. Though most who receive individual workstations, regardless of the type, will need new furniture, even in this we can build upon much of our existing equipment. The transition to individual workstations can be a phased approach, with certain units, or staff of a certain level or function within specified units, receiving such equipment before those of other units, or with an initial phase, in some cases, of an increase in shared workstations preceding an eventual move to individual workstations.

Costs and Cost Savings

The costs outlined in the accompanying proposal, as mentioned, are estimated according to the best available information. A lot of care and effort was lavished on trying to make the estimates as complete as possible in order to present an accurate picture of the expense involved. This proposal obviously represents a considerable capital investment. It should be emphasized that there are associated cost-savings, which accrue from adoption of the proposed plan, some of which can be positively identified, and some of which can be realistically surmised. For example:

A. The next generation opac/library management system can be built upon the recommended hardware. Thus, we would be incrementally preparing for this inevitable event.

B. Replaced equipment in reasonably serviceable shape, can be "recycled," either to replace similar decrepit or failed equipment, or, in the case of the PCs, as opac terminals or CD-ROM platforms for newly acquired data resources.

C. There are tangible annual savings on communications costs which off-set the investment in expanded ethernet access. Communications with RLIN utilizing the newly released LANterm software, which makes access to RLIN via ethernet-internet possible, eliminates nearly $6,000 annually in modem maintenance charges and reduce will annual RLIN communications charges by as much as $24,000.

D. Equipment enabling us to move cataloging and catalog editing to NOTIS will eliminate more than 100,000 RLIN searches per year, plus another 75,000 maintenance transactions.

E. Closing the shelflist would save more than $30,000 per year.

F. Expanded access to Ethernet will make possible the implementation (at no further cost) of a Technical Services local area network (LAN). A Technical Services LAN would provide several cost saving benefits. First, it would allow us to make our documentation available to staff online. Technical Services floats upon a sea of documentation. All of it is already in online form, but we continue to spend enormous amounts of time and use reams of paper and spend untold dollars on photocopying costs to make it available to staff who need it. The availability of this documentation over a LAN would eliminate the majority of these expenses, and additionally provide the benefit of online (keyword) searching to the contents. Eventually, hypertext programs, like Mosaic, could be applied to provide linkages between similar entries in disparate documents, thus speeding recall and retrieval geometrically.

Secondly, a LAN would enable us to share application software. The benefits of this are several. We could buy site licenses for such software, in many cases more cheaply than individual purchases for each machine. When upgrades to the software become available, only the LAN version need be replaced, eliminating the need to repeat this operation on each and every machine. Making software available over a LAN would promote standardized applications for primary functions like word-processing, databases, spreadsheets and communications. Finally, a LAN will enable us to network and share certain devices, especially printers, which will allow us to prevent the proliferation of these costly peripherals.

G. Finally, and perhaps most importantly, my supervisors and I are sufficiently confident that the significantly enhanced productive capacity, represented by the proposed equipment, will mean that a significant reduction in staff will be possible. In fact, following an initial infusion of capital to "jump-start" the plan, we are willing to fund the majority of the proposed plan, and succeeding replacement/upgrade initiatives through planned staff reductions.

Systems Office Considerations

An increase in both the number and the power/complexity of computer equipment has significant ramifications for potential demand on the Library Systems

Office. We recognize this fact and also recognize that it will require us to bear more of the technical burden, from installation to certain maintenance functions, than formerly. Fortunately, we now have several staff who are both able and willing to assume a greater responsibility in this area.

Implementation

The accompanying proposed implementation plan is predicated on a four year implementation schedule with equipment acquisitions phased in according to the following considerations: (1) priority need of individuals and/or units, taking into account, in particular, supervisory responsibilities, opportunity to realize significant and immediate productivity returns from increased access to automation, hours spent at a terminal during the normal work day; (2) availability of existing equipment for redistribution; (3) the ability to allocate projected funds evenly over the course of the implementation process.

TECHNICAL SERVICES COMPUTER EQUIPMENT PLAN: A Proposal

SUMMARY

PHASE I COST: $32,500

1. Upgraded workstations for the heads of Cataloging and Database Management.
2. Manager's workstations for team leaders currently without computers.
3. Ethernet network connections for remaining Technical Services managers.
4. Workstation furniture for staff who currently have individual workstations and for those managers recommended to receive new individual workstations.
5. Workstation (recycled) for Circulation Service.

PHASE II COST: $65,000

1. Transfer catalog editing (maintenance) functions from RLIN to NOTIS.
2. Manager's Workstations for remainder of Technical Services professional management staff.
3. Upgraded workstation for Circulation Services.
4. Individual workstations for staff of the Periodical Receipts Unit.

PHASE III COST: $65,000

1. Transfer new cataloging functions from RLIN to NOTIS.
2. Individual workstations for staff of the Serials Record Unit.
3. a) Individual workstations for the remaining Order Division units.
   b) Shared line workstations for each of the above units.
   c) SharedlLine workstation Periodical Receipts Unit.

PHASE IV COST: $65,000

1. Individual workstations for the staff of the Database Interface Unit.

2. Individual workstations for the staff of Catalog Division and Near East Technical Services Cataloging Teams.

PHASE I-IV COST

Total equipment:	$227,500
Networking (per month):	$850

****

EQUIPMENT TYPE SUMMARY

Manager's Workstation

*486 class CPU (DX model, 66 MHz), with 8MB RAM and 424MB hard drive, 15" color monitor, Inkjet or 24-pin dot matrix printer, Ethernet connection + Ethercard, LANterm (RLIN ethernet communications software--Windows version in development), TCP3270 (TCP networking software for communications with NOTIS and the University LAN), Enhanced MOSAIC (networking software for communications with cataloging documentation web and the Internet)

Software suite: Wordperfect (word processor), Paradox (relational database), Quattro Pro (spreadsheet)

Est. cost per unit: $2,500 (add $700 if equipped with barcode wand)

Line Workstation

*486 class CPU (SX model, 33 MHz), with 8MB RAM and 212MB hard drive, 14" color monitor, Ethernet connection + Ethercard. LANterm (RLIN ethernet communications software--Windows version in development), TCP3270 (TCP networking software for communications with NOTIS and the University LAN), Enhanced MOSAIC (networking software for communications with cataloging documentation web and the Internet)

Est. cost per unit: $2,000 (add $700 if equipped with barcode wand)

*Note: Downward trending hardware prices make it likely that higher end CPUs, larger monitors larger hard drives and more RAM will be substituted in later phases of the implementation plan.

Geac (TCS) controller terminal

A 386 class PC with special programming allowing off-the-shelf dumb terminals to communicate with the Geac 9000 computer.

Est. cost per unit: $5,500

Dedicated (dumb) terminal

A standard general purpose CRT with attached keyboard.

Est. cost per unit: $385

Workstation furniture set

48" x 30" x 29" Data table (desk) with overhead shelf and center drawer.
48" x 30" x 29" Terminal table with adjustable drop-leaf keyboard slot.
30" x 30" x 29" Connector table
Detached movable pedestal drawer set (2 standard drawers; 1 file drawer)

Est. cost per unit: $790

EQUIPMENT ACQUISTION SCHEDULE

Phase I
8 Manager's workstations
12 Workstation furniture sets

Phase II
7 Manager's workstations
10 Line workstations
1 TCS controller terminal
6 Workstation furniture sets
Misc.: 2 additional barcode wands for existing terminals; RAM upgrade for two prototype line workstations

Phase III
18 Line workstations
1 TCS controller terminal
2 Dedicated (dumb) terminals
26 Workstation furniture sets + 2 additional terminal tables

Phase IV
16 Line workstations
33 Workstation furniture sets

TOTAL PROJECTED ACQUISITIONS THRU FOUR YEARS OF PLAN

15 Manager's workstations
44 Line workstations
2 TCS controller terminals
2 Dedicated (dumb) terminals
77 Workstation firniture sets (mostly being partial sets adding to existing terminal tables)

DETAILS

1. a) Upgraded workstations for the heads of Cataloging and Database Management.
   b) Manager's Workstations for team leaders currently without computers.
   c) Network connections for remaining Technical Services managers.
   d) Workstation furniture for staff who currently have individual workstations and for those managers recommended to receive new individual workstations.

This part of the proposal addresses equipment needs for management staff who do not have PCs (6) and replacing the old IBM/PS-2 computers assigned to the heads of Catalog Division and DBMS.

One of the displaced IBM/PS-2s should be retained as a NOTIS GTO terminal, for passing records from RLIN to NOTIS, against the day we begin cataloging on NOTIS. This would constitute the second of the two such GTO terminals which was approved as part of the original NOTIS purchase. As it turns out, GTO is very finicky about which hardware it will work with, and experimentation has shown that the old IBM/PS-2 is best for this purpose. Each GTO can service 15 cataloging workstations. The remaining IBM/PS-2 could be used as replacement equipment either within Technical Services or in another department.

Also addressed here is the need for workstation furniture for those staff targeted to receive new workstations and for those staff who have existing individual workstations (older equipment) with the hardware currently on their desks in unergonomic/unhealthy arrangements. Finally, this part of the proposal recommends Ethernet lines for those managers who currently have workstations but no communication capabilities, and recommends conversion of four existing sytek lines to ethernet, because University Computing Services will phase out sytek service by 1996.

New equipment needed:

8 Manager's workstations, 2 equipped with barcode wands
12 Workstation furniture sets (specifications attached)
Conversion of 4 existing sytek lines to ethernet ($100 est.)

2. Transfer catalog editing (maintenance) functions from RLIN to NOTIS.

We have spent the better part of the last year learning the NOTIS cataloging subsystem, experimenting with various access software, and trying to determine the impact of transferring DBMS operations from RLIN to NOTIS. Since our RLIN-to-NOTIS data-loader can not handle certain important, high-volume maintenance transactions (transfers, withdrawals, added copies), DBMS staff must perform these, and other operations, redundantly on both RLIN and NOTIS. Thus, it is a high priority for us to shift our catalog editing focus away from RLIN and onto NOTIS, which is our primary database of record.

We are now ready to go ahead, pending the acquisition of additional computer equipment, and the resolution of two issues which affect operations and services across the Library system, viz., (a) the ramifications of RLIN no longer being the database of record for Roman language cataloging, and (b) whether or not we can discontinue the production of shelflist cards. I will prepare something separately, for wider discussion, on the database of record and shelflist questions.

At this point, my objective is to provide information relating to the computer equipment we will need to effect the transfer of DBMS catalog editing operations from RLIN to NOTIS. We will need to purchase six additional Line Workstations for Datbase Management Section (DBMS), 3 for Catalog Division and 1 for Near East Technical Services (NETS). The Database Interface Unit (staff: 6; primary functions: transfers, withdrawals, replacements, recons, added copies), and Serials Record Unit (staff: 4; primary function: serial volume adding, some new serial cataloging) are the two DBMS units whose workflow is affected. These units need access to both NOTIS and Geac. Geac access would require the purchase of an additional TCS controller and barcode wands. Catalog Division and NETS only require access to NOTIS.The requested equipment would replace ten existing dedicated RLIN workstations which utilize older PCs (286 class). The dedicated RLIN lines can be given up and the equipment can be transferred to other departments for their use or sold as surplus.

Also included is a recommendation for upgrading our two existing NOTIS workstations with Geac access (port capacity available on the TCS specified in this recommendation), barcode wands, and additional RAM (we underestimated the memory requirements when the original request was submitted).

Existing furniture is sufficient.

New equipment needed:

10 Line Workstations, all equipped with barcode wands
2 Additional barcode wands for existing equipment
1 TCS Geac controller terminal
RAM upgradefor two existing Line Workstations (from 4MB to 8MB each) (est. $500)

3. a) Manager's Workstations for remainder of Tech Services professional management staff.
b) Shared workstation (Macintosh) for Circulation Division Supervisors.
c) Individual workstations for staff of the Periodical Receipts Unit.

This involves upgrading the existing workstations of the five Order Division managers, who currently have older (286 class) PC models, and that of the Reserve/General Periodicals Librarian, who has a better but nonetheless lower-end PC, to the manager's workstation configuration recommended in the accompanying request. It also would include replacing Head, Near East Technical Services' Macintosh with a Manager's Workstation, to get him on the same equipment page as the rest of us now that Near East order operations are moving from their specially developed Mac database to Geac.

I plan to allocate this Macintosh equipment (IIci + laser printer) to Circulation Division for use by the management staff of the Circulation Division in scheduling student workers, corresponding with patrons, and creating signage, all of which they do in considerable volume, and for which this equipment is particularly well suited. 386 class PC of the Reserve/General Periodicals Librarian could be allocated as best suits the Library's needs, either as new or replacement equipment.

The five 286 class PCs, currently serving the management staff of the Order Division, are equipped with Geac LTS cards enabling them to function as dedicated terminals, so they would be ideal as replacement terminals for old Geac-Geac equipment or as additional dedicated individual workstations. Note: A partial workstation upgrade for the Order Division management group, in the form of ethernet lines and furniture, is already contained in item 1 above, which would restrict the upgrade costs described here to those associated with the PC equipment alone. We would have to purchase another TCS controller to provide Geac access for each of these staff.

The staff of the Periodical Receipts Unit (Order Division) spends about 3/4 of their workday at the terminal checking in and claiming periodical issues, etc. The staff of this unit, which numbers six, only requires Geac dedicated workstations and already have five assigned to them. One of the displaced manager's PCs equipped with an LTS card (see above) could be used as the additional terminal obviating the need to purchase any additional hardware at all. Actual additional equipment would entail furniture sets for all staff, but would add to five existing terminal tables.

New equipment needed:

7 Manager's Workstations
1 TCS Geac controller terminal
6 Workstation furniture sets for Periodical Receipts Unit (misc. pieces adding to exist. equipment)

4. Transfer new cataloging functions from RLIN to NOTIS.

As with DBMS functions, we have been learning and experimenting with cataloging on NOTIS. A very well-designed Windows interface, coupled with greater availability of access to cataloging documentation and tools online, make this a very viable option for us. While there would be costs for new equipment, there would also be significant cost savings by being able to give up dedicated RLIN lines (with associated line and modem maintenance costs). Moving Roman-language cataloging from RLIN to NOTIS has to be done as a block, i.e., we have to move all such operations and staff over simultaneously. Rare Books non-AMC operations could move to NOTIS as a separate package. Near East vernacular cataloging will remain based on RLIN for Arabic and Hebrew. Likewise, CJK and AMC cataloging will have to stay based on RLIN because of their special requirements.

For terminals which do not currently have them, I recommend the purchase of barcode wands. The barcode is an absolutely critical piece of information which is difficult to transcribe accurately because of its length (15 characters composed of 14 digits and a space). DBMS currently corrects annually around 1,500 barcode entries which were transcribed incorrectly. Some of our terminals are already equipped with wands. They may be used interchangeably with Geac, NOTIS and RLIN, so we will not have to re-equip terminals should we eventually replace Geac with NOTIS for circulation. The request also includes wands for two existing NETS RLIN workstations. The new line workstations will replace ten dedicated RLIN workstations. We can give up all ten dedicated lines and associated modems.

New equipment needed:

10 Line Workstations, equuipped with barcode wands
Furniture = 2 additional terminal tables

5. Individual workstations for staff of the Serials Record Unit.

As with serial receipt work, serial adding is a computer-intensive operation requiring a lot of record revision and recon. Of the six workstations requested in 2 above, two are projected for this Unit, the staff of which spends around 3/4 of their workday on either RLIN or NOTIS (eventually), or Geac (creating or updatring circulation records). Two additional Line Workstations are required for DBMS to move this staff into individual workstations.

New equipment needed:

2 Line Workstations, equipped with barcode wands
4 Workstation Furniture Sets (minus two existing terminal tables)
Geac access:no cost (2 additional TCS ports available from 2)

6. a) , Individual Geac Workstations for the remaining Order Division units: Approval/Continuations, Invoice, Order, and Monograph Receipts & Holdings.
b) Shared Line Workstations for each of the above units.

As noted above, staff of these units spend well over half their workday at the terminal with more and more online tasks continuously accruing to their responsibilities as time passes. In the workstation recommendations below, the Line Workstations are projected to replace RLIN workstations with five existing RLIN dedicated lines given up. Geac access (to acquisitions subsystem) has been included in the Line Workstation configurations because Order Division work trends are emphasizing the increasing benefit of being able to utilize NOTIS or RLIN and Geac in a multi-tasking mode (simultaneous access running two databses in different windows).

Line staff equipment requirements: individual workstations with dedicated Geac acquisitions system access; one shared multi-function line workstation with Geac acquisitions system access for each unit. Unit managers received manager's workstations per section 3 above.

Existing equipment for distribution:

14 dedicated terminals with existing Geac access ports
6 286 class PCs with Geac LTS cards enabling them to function as dedicated terminals.

Number of line staff: 22.

New equipment needed:

2 dedicated (dumb) terminals
5 line workstations with Geac acquisitions system access (one for each of above units and one for Periodical Receipts Unit referenced in section 3 above)
1 TCS Geac controller terminal to provide additional port capacity for the above (1 TCS accommodates up to 8 ports)
22 workstation furniture sets (minus 14 existing terminal tables)

7. Individual workstations for the staff of the Database Interface Unit.

Workstation requirements: Line Workstation, with Geac access.

This Unit, whose responsibilities center on editing and problem-solving using

RLIN, Geac and NOTIS spend 2/3-3/4 of the workday online. Of the six Line Workstations already in place as a result of previous recommended purchases (2 above), three could be allocated for the exclusive use of the Database Interface Unit. Two additional workstations would be necessary. Two existing Geac dumb terminals could be given up and the ports used to support access by these additional workstations, so an additional TCS is not projected.

We would need to replace much existing furniture as it consists mainly of older small terminal tables without drop-leaf keyboard panels.

New equipment needed:

2 line workstations with Geac circulation system access, equipped with barcode wands
5 workstation furniture sets

8. Individual workstations for the staff of Cataloging Teams of Catalog Division and Near East Technical Services (NETS).

I anticipate that cataloging operations will become more and more computer-intensive in the relatively near term, as tools and resources migrate to online databases. LC Subject Headings has already done so, and the LC Classification Schedules are due to be released in online form sometime in 1995.

I have indicated in the accompanying memo that we see much advantage in placing cataloging documentation, already in computerized form, on a LAN server to take advantage of online indexing and eliminate costly labor-intensive photocopying. Thus, this staff group, which now spends 1/2 to 2/3 of their workday online can be expected to see the proportion of their time spent online to increase until it is comparable with units described above. Line staff (professional and support) equipment requirements: line workstations with barcode wands.

Equipment acquired in previous phases of this plan (see sections 2 and 4 above):

14 line workstations.

Total line staff (professional and support): 28

New equipment needed:

14 line workstation, equipped with barcode wands
28 workstation furniture sets (minus 14 existing terminal tables)

SPEC

SYSTEMS AND PROCEDURES EXCHANGE CENTER

TRAINING DOCUMENTATION

ASSOCIATION OF RESEARCH LIBRARIES OFFICE OF MANAGEMENT SERVICES

Standard Workstation Configuration

Technical Services

Albert R. Mann Library
Cornell University

Hardware:

- Apple Power Macintosh 6100/66, CD-ROM, 350MB Hard Disk, 24MB RAM
- Sony 15sf, 15" color monitor
- Apple StyleWriter II inkjet printer.
- TPS Uniscan US-300 barcode wand-reader
- Hewlett Packard LaserJet 4M Plus laser printer (shared)
- Every workstation is connected via built-in ethernet to our local Novell network (v3.11) and in turn to the Cornell campus backbone.

Standard Software (installed on local machines)

- Apple system software v7.5
- IBM PC emulation - Insignia Solutions' **SoftWindows**
- Macros - CE Software's **QuicKeys**
- Scripting - Apple's **AppleScript**
- Email - Qualcomm's **Eudora***
- Terminal emulation - **Comet** *. Supports vt100 and 3270 protocols.
- WWW browser - Netscape Communications' **Netscape***
- FTP client - Dartmouth College's **Fetch** *

Shared Applications (run from Novell file server)

- Microsoft **Word v6.0**
- Microsoft **Excel v5.0**
- Claris **Filemaker v2.0.1**
- Library of Congress **Cataloger's Desktop**

* Freeware and/or available to us at no cost through Cornell University's campus-wide set of connectivity software.

Tech Services Training Outline

Day One

- Mac Basics
  - Definitely Basic
    - Mouse
    - On/Off - I think I'll eject that dis.....
  - Navigating around the Finder
    - What is this Finder thing anyway?
    - What is the Desktop?
      - Icons
        - Disk
        - Folder
        - File
        - Program
        - Hey Look, there's a cute little trash can!
    - File/Edit/View/Label/Special
    - The Help Menu
      - Balloon help
    - The Applications menu
      - You mean I can work with more than one thing at a time
  - The Apple Menu
    - About this...
    - How to create aliases
    - Add an alias to the Apple menu
    - Nifty things to play with
      - KeyCaps
      - Calculator
      - Puzzle
      - Scrapbook
        - What's this clipboard thing again?
      - Stickies
  - Navigating through dialog boxes with Simple Text
  - Control Panels
    - Color
    - General Controls
    - Date and Time
    - Mouse
    - Sound
    - Energu Saver
  - A Tour of the System Folder - How exciting!
    - Apple Menu Items
    - Control Panels
    - Extensions
    - Preferances
    - Startup and Shutdown

Virtual Computer Break Is Dead!

Long Live the Big Mac Attack!

Yes sir! With the new PowerMacs, it's clear that the Virtual Computer Break had to go! So, drive right up to the (dare I say it) Window, and order your own Big Mac training program. We should meet soon to find out where's the beef in our Mac. In the meantime, consider this menu and select one from column 1, 2, 3, 4, or 5. Please, mark each answer once!

1 - strongly agree 2 - agree 3 - neutral 4 - disagree 5 - strongly disagree

(1) (2) (3) (4) (5) I like my Mac (warm up question)

(1) (2) (3) (4) (5) I'm comfortable using Eudora

(1) (2) (3) (4) (5) I want more training with Eudora

(1) (2) (3) (4) (5) I'm comfortable using Word 6

(1) (2) (3) (4) (5) I want more training with Word 6

(1) (2) (3) (4) (5) I'm comfortable using QuickKeys

(1) (2) (3) (4) (5) I want more training with QuickKeys

(1) (2) (3) (4) (5) I'm comfortable using Comet

(1) (2) (3) (4) (5) I want more training with Comet

(1) (2) (3) (4) (5) I'm comfortable using Netscape

(1) (2) (3) (4) (5) I want more training with Netscape

(1) (2) (3) (4) (5) I'm comfortable saving files

(1) (2) (3) (4) (5) I want more training on where to save files

(1) (2) (3) (4) (5) I'm comfortable configuring my own Mac

(1) (2) (3) (4) (5) I want more training on how to configure my own Mac

(1) (2) (3) (4) (5) The Big Mac Attack should occur once a week

(1) (2) (3) (4) (5) The weekly Big Mac Attack should be no more than 20 minutes long

(1) (2) (3) (4) (5) The Big Mac Attack should occur once every two weeks

(1) (2) (3) (4) (5) In addition to the Big Mac Attack, we should also include hour long formal classes

1. Introduction to your workstation

Welcome to Your Workstation

Your new workstation is a Pentium, an advanced kind of PC, that allows you to communicate with NOTIS and RLIN, write correspondence and perform other tasks at one machine. Your computer has physical parts called hardware, which include a monitor, a keyboard, and a processor (CPU). Your hardware runs software programs, or applications, which are a series of detailed, basic instructions telling the computer how to perform a variety of functions. Highlighted below are features of the workstation that will make your work easy and fast.

Graphical User interface (GUI)
Your computer and you communicate using small pictures, or icons. By clicking on an icon you tell your computer to run a program or that you want to give it some other commands. Icons can represent many things, including programs, computer commands, or hardware components, such as drives. Some examples are:

Program Icons
Command Icons
Print Command
Drive Icon
Floppy disk

This way of communicating with your computer is called, using a GUI ("graphical user interface," pronounced "gooey").

The Mouse
The mouse makes moving around your computer screen easy. There are two buttons, a right one and a left one. You can reprogram the mouse to respond to your clicking on the right-hand button if you mouse with the left, and vice versa. Open up the Control Panel, select "mouse," then click on the square in fromof the line "Swap Left/Right Mouse Buttons," and click on "OK." Some selection operations also require you to use both buttons. If you need both buttons in order to do something complicated, help screen instructions will usually be available to you. You perform tasks by two basic mouse actions - clicking and dragging. The mouse allows you to easily control the cursor, activate an icon, or manipulate text. By sliding the mouse over your desk, you move the cursor across the screen.

Basic Mouse actions:
Click. Quickly press and release the mouse button.

Clicking once can:
change the cursor position
select a program icon or drive icon
activate a command icon, or toolbar icon

Clicking twice can:
activate (run) a program icon
open files

Drag
Press and hold down the mouse button while you move the mouse. Dragging highlights an area on the screen, and is used for manipulating text (deleting, copying, or moving icons, and moving windows).

Multi-tasking
You can have several different programs running at the same time; this is called multi-tasking. Your workstation allows you to switch easily from program to program. Your computer allows you to communicate directly with other computers or databases at Cornell, such as NOTIS. Via the Internet, you can even communicate with computers around the world.

Software
Various programs have been loaded into your computer and are stored on the hard disk, or the memory part of your computer that is not on diskettes. For now, each one of these programs appears as a discrete icon in the appropriate window displayed on your screen, but later we plan on getting a special version of the Bear Access launch pad that will display buttons for these tools that we use here in technical services. (A "button" is a rectangular shaped bar with the name of a particular tool written on it.) When that happens, upgraded versions of supported software will automatically download to you. Also, reinstallation (in case someone's system becomes too mucked up to save) should be fairly simple.

For now, your workstation has the following software:

MS DOS 6.3--MS DOS is the program that supports Windows. Every computer needs an operating system. On the Mac, it's (currently) called System 7. Your Pentium uses PC-DOS (PC Disk Operating System). Though you may not see it, the operating system is always running while the computer is on. The operating system manages the flow of information to and from the various parts of your computer system. MS-DOS responds to a particular set of commands, but you will rarely use these because your computer also has an easy to use, higher level, operating environment, called Windows for Workgroups, which is a version of Windows.

Microsoft Windows for Workgroups 3.1.1--This is the program that gives you the ability to adjust the way your computer organizes and displays the information you need. It also allows you to connect to networked printers, shared files, and programs that use the Internet. Windows for Workgroups (WFWG), , is a graphical operating environment, runs on top of DOS, makes the computer easier to use and provides greater functionality and flexibility. Forthcoming versions of the Windows software are slated to become more and more like the Mac GUI. All of the programs for the standard library workstation operate in the WFWG environment, so understanding the basic features of WFWG will drastically reduce the time and energy needed to do your daily tasks. Some of the advantages that WFWG offers are the following:

Graphical User Interface (GUI) or icons
Multi-Tasking
Standardized Format

McGill 2.6 (TCP3270)--This software allows you to open up a NOTIS session. It is a telecommunications software, which means it requires you to have an Ethernet connection. TCP3270 for Windows has the ability to create up to 5 concurrent sessions. You will probably never need to run 5 concurrent NOTIS sessions, but you may want to run 2--one LTCU session and one LUCU, for example, and move back and forth between them. You can click on any portion of a protruding "window " in order to select it, or you can hold down the "alt" key while pressing TAB. This will move you through available sessions until you arrive at the one you want to work in. In McGill, it is also possible to create a variety of macros in order to make your work more efficient, better than on the 3163, but fairly similar to Comet. A macro is a series of commands that have been programmed to happen one after the other when your computer is logging on or when you type a certain key combination, for example CTRL and any other key, or ALT and any other key.

RLIN-for-Windows--The RLIN Terminal for Windows software is the latest in a series of RLG terminal software programs that are designed for:

--searching and direct online input (acquisitions, authorities, cataloging, ILL) in the RLIN system
--PASS command transfer of RLIN MARC records to a disk file or local system (although Cornell has not yet implemented this from individual desktops)
RLG has combined Windows and other technology to improve the look, feel, and control of RLIN processing sessions -- but "without" making changes to the RLIN interface that would require any relearning or special training sessions. Improvements include:
--ability to set screen and text colors, font size, etc. and to save these settings as your personal session profile
--use of a mouse to move the cursor and to highlight text for copy-and-paste operation
--easy printing and downloading of records with Print Screen, PASS (for RLIN MARC output to a local system--although Cornell has not yet implemented this from individual desktops) and PUT (for RLIN MARC output to an FTP server, and again, Cornell has not yet implemented this from individual desktops)
--compliance with the Windows Sockets programming interface, to work with a wide range of local area networks
--easy installation into Windows for Workgroups, and online help for terminal software functions.

Eudora 2.0.3--This software supports your e-mail. For those of you coming from Pine over a CRUX account, Eudora will be an improvement in that your mail will download to your own hard drive and will be easier for you to save and manage. The graphical presentation of Eudora is attractive and easy to use. For those of you coming from the Macintosh version of Eudora, there's not much difference.

Netscape 1.1--This is the software that allows you to connect to the World Wide Web over the Internet It is a kind of World Wide Web browser. With it you can access information resources that contain internal links to other related documents, save addresses for interesting sites, and perform broad, key-word searches. We will use this tool in CTS to access information about our staff and our procedures.

2. Customizing Your Desktop

1. The place to start is Program Manager. This is what you see when the machine is through powering up. Usually a rectangle (called a "window") entitled Main shows up first, inside of which are a number of small pictures called icons, and below which are some named squares. The named squares at the bottom represent other windows. The icons in each window represent programs that you can run by double-clicking. I recommend that you start by closing the Main window (by clicking on the small gray box in the upper left hand corner).

If you don't feel comfortable organizing your space before you've fixed your colors, go to step 5 below (in this section). Then come back to steps 2-4.

2. Open the File menu and select "New." You will be given a choice between "Program Group" and "Program Item." Select "Program Group" and then click on "OK." You will be prompted for a "description" (name). Fill in the name that you want to use for your personal desktop space. I have named mine "Judyspace," but I'm sure you can be more creative (or more objective, or whatever you prefer) than that. Call it what you want, but don't leave any spaces between the words if you have more than one word in the name. Alternatively, use Main as your personal window, or make several small personal windows, either using existing names or making up new ones.

3. Open up the various program groups by clicking twice on their icons, and identify the application icons that you need in order to do your everyday work. These are the icons that you want to drag into your personal space. To drag an icon, click on it, and without letting up, move the mouse across the screen until it is where you want it. Here are the icons I put in "Judyspace":

File Manager
Control Panel
Print Manager
Telnet Network Set-up
Eudora
WS__FTP
TCP3270
Netscape
WP Win 6.0
Notepad
Write
RLIN-for-Windows

4. Pull down the Windows menu and click on Arrange Icons to make your space tidy.

5. Open the Control Panel. Double-click on color. Click on Color Palette, so that the color window doubles in size and gives you colors to choose from. The areas I re-colored are:

Desktop
Application Workspace
Window Background
Active Title Bar
Inactive Title Bar

There is a list of areas under the heading "Screen Element" that you can select from by clicking on the down arrow to the right of the list. Then click on the element that you intend to color. When you click on a color box in the area entitled "Basic Colors," part of the screen example that you have in the left hand column of this dialog box will change its color accordingly. If you like the way it looks, click on "Save scheme." You will be prompted for a name for your scheme. (I named mine "Judy"). Repeat this sequence for every element you color until you are satisfied, then click on OK. Or you can browse through some pre-coordinated schemes by selecting one of the names from the "Color Schemes" scroll box in the same way that you selected screen elements above. Don't forget to go back through steps 2-4 if you skipped them the first time through.

3. Using McGill

In addition to the McGill manual that you will receive as part of your basic documentation, here is some brief information about McGill basics.

Opening and Closing McGill Sessions
McGill connects you to another computer or host by using that computer's IP (internet protocol) address. IP addresses plus other settings for hosts to which you frequently connect (such as NOTIS) can be saved into a default sequence called a "profile." Each time you connect to a desired host, you are opening a new "session." McGill allows you to have up to 5 concurrent sessions running at the same time. This may come in handy if you have a lot of cutting and pasting to do for which you would like to see full screens or if you want to work independently on different sessions without losing search results or a particular display from any particular session.

When McGill is not currently running:

1. Double click the TCP3270 icon from the Program Manager, or single-click the icon and press the Enter key. This opens McGill. Click OK on the opening screen.

2. You must perform steps 5a, 5b, and 5d, below, at least once for your system to automatically connect to Cornell's NOTIS. If you complete 5c, below, you can also automate your logon.

3. Log in as usual, or program a default logon into your NOTIS session (see number 7, below).

4. Log off as usual or single-click "Close session" from the File menu. Then click "Terminate" from the Close Current Session Dialog Box.

Profiling a Default NOTIS Session

5. To setup a default NOTIS logon session, pull down the Options menu and select Session Profile, then

    5a. Under the 3270 screen, choose 3279, Model 2, Enable Extended Attributes and Send OEM Reply RPQ.

    5b. Under the ALA screen, be sure Enable ALA support is checked. Also check the two side-by-sides and NOTIS.

    5c. Under the General screen, select the logon macro, which you must already have written via the Macro Editor sequence under the Options menu, see instructions below in number 7.

    5d. Under Host, type "CORNELLC.CIT.CORNELL.EDU" under IP Host/Gateway and "NOTIS" under session long name (instead of default).

6. Pull down the Fonts menu. You must select ALA Courier for your font, not the TT ALA Courier New. If it is not there, you must first select it in Windows, in the Control Panel, under Fonts.

7. If you need help and you can't find one of the CTS trainers, you can get help online by opening the "Help" menu (the last menu on the right at the top of the screen).

Creating Macros

8. Macros are keyboard shortcuts. They make repetitive actions quick and simple. A macro is a series of keystrokes that is saved and named. Once saved and named they can be assigned to the keyboard (key combination, function key, or number-pad key) or a screen utility (toolbar or hotspot). To execute a macro, you simply invoke the shortcut.

Pull down the Options menu, and select the Macro Editor. Under Macro Name, type something in, for example, "logon." Tab to the "Assigned Macro String" area. Type in the appropriate command sequence. You may select commands from the list of "System Commands" by scrolling through and clicking on the one(s) you want. One example of a logon macro is "Tab Tab "d sna" Enter IPause "libstaff" Enter" Words that are typed in (as opposed to commands that are executed) need to be written inside quotation marks in the Macro String area. When you are finished, click on SET and CLOSE.

Assigning Macros to a Key

9. To assign a macro to a particular key, select Keyboard Mapping under the Options menu. Click on the key to which you want to assign the combination (and then on shift, control, or control/ shift, if so desired). Choose either macros, commands, or characters--the default is commands. From the scroll bar on the right, select the appropriate function--all macros that you wrote in Macro Editor show up here, for example-- and drag it up to the key you have already selected. When you drop it on that key the macro name will appear to the right of the "normal" "shift" "control" or "control/shift" line that is listed under the key you have selected. Click on OK.

Checking the Session Status

10. To check the number of McGill sessions that you have open, single-click Window from the menu bar. All open sessions will be listed. The numbered session that has a check mark in front of it is the session in which you are working.

11. To quickly file through all open McGill sessions as well as all other applications that you currently have running, press and hold down the Alt key, then press the Tab key repeatedly. Each time you press Tab, the name of a McGill session or your other open applications will appear.

12. To view the Task List so that you can see all McGill sessions and all other open applications all at once, single click the Menu Control box in the upper-left hand corner of the window, then single click on "Switch to". The Task List dialog box will appear. You can also get to the Task List by typing Ctrl/Esc. Double-clicking on any of the applications or sessions listed will move you to whatever you clicked on.

Rearranging Multiple Sessions

13. To rearrange multiple session windows on your screen so that all open sessions are visible, single click "Cascade" from the Windows menu. To switch to any of the visible sessions, click on any portion of the session that you can see. That session will come to the front.

Resizing and Moving Windows

14. To resize a window, place the cursor on the border of the window you want to resize. The cursor will change to a horizontal double-arrow. Keeping the left mouse button pressed (or right button if you are a lefty and have re-assigned your mouse buttons), drag the mouse until you have resized the window to the size you want.

15. To move a window, position the cursor anywhere in the title bar. Keeping the mouse button pressed, drag the mouse until you have positioned the window where you want it.

4. Using RLIN (telnet) and RLIN-for-Windows

You can access RLIN either through a telnet session or through RLIN-for-Windows.

Telnet
Accessing RLIN through telnet is what some of you have been doing when you click on an RLIN Comet icon or an RLIN button on a Mac Bear Access Launch Pad, and others have been doing by typing #rlin on their 3163s.

1. To use RLIN via telnet on your Pentium, double-click on the Telnet icon. Open the Connect menu and click on the "Remote System" button. You will get a small dialog box that asks for the Host Name. Type in "36.54.0.19" (no quotes). The port should say "Telnet" and the Term Type should be "vt100". Click on "Connect."

2. When RLIN comes up, it will look exactly the way you're used to it looking when you're not at a GTO terminal--no diacritics. You will not be able to use your Comet based "opt a" "opt b" or "opt c" commands. The only way to bring records into NOTIS from RLIN will be to GTO them. I know this is a step backwards for now, but it is only temporary.

3. The screen will be glaringly white (which you may like). If you don't like it you can select a different background color by opening the Preferences Menu, clicking on "Background Color, clicking on a color you like, and then clicking on "OK."

4. After you log off (in the usual way) you will get a dialog box saying "Connection to host lost." Click on "OK."

RLIN-for-Windows
Accessing RLIN through RLIN-for-Windows is similar to what you have been doing when you use the GTO terminal. Diacritics are visible. Eventually, the PUT and/or PASS commands will be implemented. In addition, you can personalize your screen and your logon to suit yourself.

1. Double click on the RLIN-for-Windows icon, and click OK when the dialog box asks you whether or not you want the default session.

2. The first time you access RLIN this way, you will have to open the Settings Menu, and click on "Communications." The IP address should be "36.206.0.143." The Access ID is "MONEY89." The Access ID must be in capital letters. Click "OK." After Cornell signs its site license for the coming fiscal year, different codes will be assigned in this space. Right now these are the codes to use, and they only permit 2 (yes, two) simultaneous uses of RLIN-for-Windows. This is so you can see what RLIN-for-Windows looks like, but the administration knows it is not enough for you to do your work.

3. Also under the Settings Menu is the "Color" option. If you open "Color," you can change the color of the screen background to match your mood.

4. The font that you want to use is called "ALA Lucida Sans Typewriter," which you must install via the "Fonts" option under the "Control Panel" in Windows, not RLIN-for-Windows. RLIN-for-Windows will automatically find this font if you have selected it in Windows. Not all sizes display the diacritics, so experiment with the larger font/smaller font buttons(the 6th and 7th buttons at the top of your screen) until the diacritics display

5. Also under the Settings Menu is the "Logon" dialog box. Click on the word "Logon", then key in your id, your password (it will be encrypted) and default activity, e.g. cat, aut. Then click "OK." If you have keyed your information into the "Logon" dialog box, you can be automatically logged on either by pressing the "Enter" key when the "RLIN Terminal for Windows" title box disappears or by clicking on the first icon in the icon panel at the top of your screen (a picture of a small plug connected to a small outlet). Otherwise, after clicking on that icon, key in your logon information at the RLIN prompts in the usual way.

6. Searching in RLIN-for-Windows is exactly the same as searching in any other variety of RLIN. It is important for you to realize that the "Send" key was NOT remapped to the "Enter" key on your regular keyboard. It is still necessary to send your messages to RLIN by using the plus key (+) over on the keypad. If you need help and you can't find one of the CTS trainers, you can get help online by opening the "Help" menu (the last menu on the right at the top of the screen).

Notis for Windows Documentation

How-to directions for Daily Tasks on SUL Windows-based Computers

The following set of documentation has been prepared by the Library Systems group for use by library staff learning to use the newly-installed IBM Pentium computers. The computers come with the following set of software:

> PC DOS 6.3, Windows for Workgroups 3.11, ONNet 1.0 (TCP/IP stack), McGill University's TN3270 (terminal emulation software for Notis), Samson for Windows, internet tools (Netscape, Wsgopher, Weudora, Winvn), and Microsoft Office.

This documentation and the associated training sessions are not intended to provide in-depth descriptions of how to use all aspects of this software -- rather, it is intended to give staff an extremely easy-to-use guide to accomplishing their most common daily tasks in the software environment. Expanded documentation for the programs are available either on-line in help utilities (Samson, Netscape, Office applications and others), Sweet Hall consulting for Weudora, or through manuals that are either delivered with the computers or are spotted with Expert Partners (MS Office documentation, and Windows for Workgroups). Staff are encouraged to work closely with their local Expert Partners in learning these skills, and to pursue training beyond this level through Stanford's on-campus computer training courses.

Training Agenda:

- Windows Basics
- Getting to Your Email
- Logging onto other services: OCLC, RLIN, Dialog and others.
- Internet Tools -- Review of tools and Basic Netscape directions
- Notis for Windows
- Microsoft Office Applications -- brief directions on accessing these programs

Windows Basics

Training for learning Windows will focus on several topics using the exercises in the Users Guide. The Users Guide goes into more depth on several topics that are best learned on your own computer and at your own speed, so you will be doing only specific portions of the exercises today. This manual will be an excellent resource to help you as you gain skills with Windows. A copy of the manual will be provided with every machine that is installed.

Windows Tutorial: very basic training in using, navigating, and understanding the terminology used in Windows. Open the Help menu in the Program Manager and select Windows Tutorial. Work through the tutorial on your own.

Practice controlling your desktop: work through pages 67 - 76 of the Users Guide book that comes with your computer. The is the "Getting Comfortable with Windows" section. Note that the next section, Organizing Program Items and Groups, will be good to do on your own PC when you are more comfortable with the basics.

Running Applications programs: work through pages 85 - 89 of the Users Guide. Use Office applications Word and Excel to practice this skill.

Survey the Accessories Program group: Try out the calculator, paintbrush, and notepad as examples of these utility programs. Brief descriptions of all the programs are on pages 90 - 95 of the Users Guide.

Using the File Manager: File Manager is one of the most critical pieces of the Windows applications. It helps you visualize the organization of the information stored on disks, and allows basic actions such as copying, deleting and moving files, searching for files, creating directories, and formatting and copying diskettes. The Users Guide has an extensive section on the file manager, which you should work through completely over the next couple of weeks. As an introduction, work through pages 99 - 112 today.

Getting to Your E-mail

A large share of daily communication at Stanford is via E-mail, and it's probably a critical piece of your daily work. For most of you, your mail is probably on Forsythe. Others of you use another server such as Leland, Cardinal or Aldus. Most of you will be using Samson for Windows (or "WinSam") to access those servers. If you are using "popmail" system, you may use Eudora instead of WinSam. The Weudora icon is located in the Internet Tools program group. However, you need to be aware that this is not Systems-supported software even though Eudora is in common use at Stanford.

To get your e-mail:

- Double-click on the Samson program group.
- Select the appropriate icon to access the correct server (Forsythe, Aldus, Cardinal ...). Double click on the icon to run the script. The script will automate connecting to the server, and prompt you for your User Id (or account) and password when requested.

If you use a server that doesn't have its own icon, follow these directions:

- Double click on the Samson for Windows icon or click on the Samson icon on the Microsoft Manager Tool Bar.
- Under the Session menu, select "New Telnet" or press the "Alt" and "T" keys simultaneously.
- A dialog box will ask you to type the name of the computer you want to access. You can enter either the common name (like "Aldus" or "Forsythe") or the IP address.
- Respond to the User ID (or Account) and password prompts as usual.

Logging out of a session will terminate the Samson program if it is the only session active.

You can have multiple WinSam sessions active and move between them either by activating various windows, minimizing and maximizing programs, or using the "ALT - Tab" to move between applications.

Icons representing pre-configured scripts have been provided for the following servers:

- Forsythe
- Cardinal (Elaine-best)
- Folio (CN.PAK)
- RLIN
- Melvyl
- Gladis

- Dialog
- Aldus/OCLC
- STN
- Faxon
- Blackwell

Internet Tools

The Internet Tools program group has been populated with a standard array of internet tools. The tools provided are as follows:

- Wsgopher -- Windows-based Gopher client
- Weudora -- Windows-based Email "pop" client
- Winvn -- News reader for internet news groups
- Netscape -- World Wide Web browser for Windows

Netscape:
The primary tool that you will use most often will be Netscape. SUL is currently using a Web homepage for accessing Notis documentation and expert partner documentation. The Stanford homepage also provides a wide variety of campus information. Portfolio is also most easily-accessed via Netscape. These computers have been pre-configured with the Stanford page as the home page, and bookmarks pre-set for the Systems homepage and Portfolio.

To use Netscape:

Double-click on the Netscape icon, or click on the "N" icon on the Microsoft Manager Tool Bar. The program will open to the Stanford Homepage.

Links: Links are words or phrases that act as pointers to other information. Clicking on a link takes you to that information automatically. Links are displayed as underlined words or phrases. Buttons that allow you to move backwards or forwards through links are found on the tool bar at the top of the Netscape screen.

To access the LTS homepage: Open the Bookmarks menu, and select (highlight) the "LTS Web Server" item. The LTS homepage will be displayed.

To access a web server not stored as a bookmark:

- Obtain the "URL" (Universal Resource Locator) for the service. It will look like this: http://www-sul3.stanford.edu/
- Highlight (click and drag over the text to highlight) the text in the box marked "Location"
- Type the URL text into the box and press the enter key

To add a URL to the Bookmark List:

- Access desired server as above
- Select Add Bookmark while you are connected to the Web server

To delete a Bookmark from the list:

- Select "View Bookmarks"
- Click the "Edit" button
- Highlight the bookmark to delete
- Click the "Remove Item" button

To quit Netscape:

- Select Exit fro the File menu or double-click the close box of the Netscape window.

The other internet tools are very easy to learn and use (requiring little or no training). As you become more comfortable with your computer and the way the most Windows applications behave, experiment with the news reader and gopher clients on your own.

Printing

The computers have a wide variety of printer drivers loaded and available, including those that will control network printing and use of an attached QuietJet or ThinkJet. Switching between printers is a simple task, and can be done from within most programs. The default printer is set in the Printer Control Panel. The default printer is used unless you specifically change the printer in an application or change the default printer. When you select "print" from the file menu in most programs, the top line of the dialog box will display the selected printer. If you want to change your default (where most of your printing will be done), change the printer in the Control Panel. If you want a temporary switch of printers, change the selected printer from the applications (menu item to select varies somewhat, but the mechanism is basically the same accross applications).

To change Default Printer:

- Double-click on the Main program group
- Double-click on the Control Panels icon
- Double-click on the Printer icon
- Select a different printer from the list by clicking on the name once
- Click on the "Set as Default" button
- Close the windows

For a temporary change when printing from within Word:

- Type the document you wish to print
- Select print from the File menu
- Note that the currently selected printer shows on the top line of the print dialog box.
- Double-click on the desired printer; note that the printer line changes at the top
- Click on the Close button to close the window
- Click on OK in the standard Print dialog box to send the document to the new printer
- Note that you can also reset the default printer from within Word, rather than going through the Control Panel steps above.

To change from within the Notepad:

- Type the document you wish to print
- Select the Print Setup menu item from the File menu
- Click on the radio button to switch from the Default Printer to the Specific Printer.
- Click on the arrow to the right of the choice listed in Specific Printer box to see alternatives
- Select the alternative by highlighting it
- Click OK to close the dialog box with your new selection.

Again, that's all there is to switching printers within different applications. Printing from within Notis is described in the Notis documentation (next section). There's no change in how you've printed your Email.

To start a NOTIS session:

- Double-click the group icon named NOTIS in Program Manager.
- When the NOTIS group window opens, double-click the icon named TCP3270. A NOTIS session will be launched.
- Log on as usual (i.e. hit the minus key on the far right of the keyboard, then enter userid and password).

(Note: NOTIS functions and commands are not affected by this new software, they are exactly the same as before.)

To start another NOTIS session:

- Go back to Program Manager and double-click TCP3270 again

or

- Select **Open Session** from the File menu of the session that is already running, then double-click the profile called "NOTIS".

Copy and paste within NOTIS:

- Use the mouse to select the text that you want copied.
- Click the **Edit-Copy** button on the Toolbar (or press Ctrl-c on the keyboard) to copy the highlighted text to the Clipboard.
- Move the cursor to where you want to paste the copied text.
- Click the **Edit-Paste** button on the Toolbar (or press Ctrl-v on the keyboard) to paste.

Copy and paste from OCLC/RLIN to NOTIS:

- Use the mouse to select the text that you want copied.
- Select **Copy** under the Edit menu.
- Go to the NOTIS window and move the cursor to where you want to paste the copied text.
- Click the **Edit-Paste** button on the Toolbar (or press Ctrl-v on the keyboard) to paste.
- Edit the text to make it conforms to NOTIS field format (e.g. insert colons before and after the indicators). Note that diacritics and special characters may change as a result of the copy and paste process and may need to be manually corrected.

To input diacritics:

- Follow the keyboard map provided by Systems.

Fonts:

- Use the **Font-Smaller/Font-Larger** buttons on the Toolbar to change the size of the selected font.
- Use the **Font-Select** button to change to a different font, the default is Courier New.

Colors:

- To change the background/foreground color of the NOTIS screen, select **Session Profile** under the Options menu, then select **Colors**.

To print:

- Use the **Print-Screen** button on the Toolbar, not the Print-Screen key on the keyboard.

To exit:

- Log off as usual with "cssf logoff". The window will close automatically.

Swap-Out FAQs (Frequently-Asked Questions)

Q: **So who gets these new computers?**

A: These computers are intended to replace every staff PC that is unable to adequately run Windows software. That means that anything below a PS/2 Model 57 will be replaced *if it is on a staff desk.* By now, you've probably seen a couple of the Partners come around with inventory sheets to verify serial numbers and such.

Q: **What kind of computers are they?**

A: We have ordered IBM Pentium computers. They will come with 24 MB of RAM, 1.44 MB 3-1/2" floppy drive, and a 540 MB Hard Drive. They will have a 17" Color Monitor and a Microsoft Mouse.

Q: **What software will be loaded on the computers?**

A: The computer will have DOS 6.3, Windows 3.11 (Windows for Workgroups), Microsoft Office (includes Word, Excel, PowerPoint and some smaller utilities), communications software, a Notis "client", internet tools, and Samson for Windows. All of the computers will be set up identically; with the exception of a couple of unique configurations.

Q: **When will my computer be installed?**

A: Those of you who will receive computers as a part of this swap have been notified. Your computers should be on your desks on Feb. 15th. We are installing them prior to the rest of the staff so that you can have time to work with them prior to running the training for your staff.

Q: **When do my users get their computers?**

A: A tentative schedule of installations will be distributed today. We have sufficient computers to do installations through the 2nd of March, and expect the rest to be delivered any day now. As all computers have not been delivered, please consider install dates after 3/2 to be tentative. We will confirm install dates at least 1 week prior to the scheduled date.

Q: **How big is the new computer? My users have very small desks.**

A: The monitor is too tall to sit on the CPU unless you are a very tall person. I have attached a copy of a diagram showing proper ergonomic placement of monitors and keyboards. The CPU can be placed on the floor, or just about anywhere within a couple of feet of the monitor. If you or your staff need to change a workstation to adjust for the size of the new computer, please figure it out and leave a clear picture for the installers.

Monitor Height (table top to top of monitor): 18"
Monitor Depth: 20"
CPU Dimensions: 14" wide, 17" deep, 5" high
Keyboard will be the standard IBM 101 keyboard
Mouse: Leave about a 6" X 6" area for the mouse to be used next to the keyboard (same height)

Q: **Windows? I'm just learning, so how can I teach the staff in my area?**

A: All Expert Partners who will act as trainers for staff will be getting not only a full-day Windows class, but will also attend a short session (in Systems Training room) on the Stanford/SUL-specific software such as the Notis client and Samson for Windows. Those pieces of software are extremely easy to use, and will take little skill to teach to novice users. To assist in your training sessions, we will be providing documentation that will be very simple for users to follow. In addition, one of the Systems operations team will be available at the beginning of each training session to help get things going. You will not be expected to train users beyond a very elementary level in the training sessions. The objective for the sessions will be to give users the basic tools to enable them to do standard daily tasks when they sit down to their new computers.

Q: **My users have a whole bunch of files on their current PC that they can't be without. How do I help them prepare to move them to the new PC?**

A: Systems ran a brown bag session on file backup/conversion/transfer a week or so ago. Additionally, we will work with those of you who have the new computers to get your own files moved, so this will not be a new process. **Basically, you will need to remind users that have files to move that they are responsible for either taking care of that process themselves, or getting your help.** In turn, we will help you as needed. When we arrive to install the new computer, we will assume that any files that are needed from the old one have been backed up, and we will remove the old PC. **After that moment, the old PC will not be available for file retrieval!** You may also need to assist the users to restore the backed-up files to their new computer.

Q: **What do I need to do to get my users ready for their training?**

A: Five areas need your attention:

Workstation ergonomics: Help users figure out how the new computer will be situated at their desk. See the attached sheet on proper ergonomic setup.

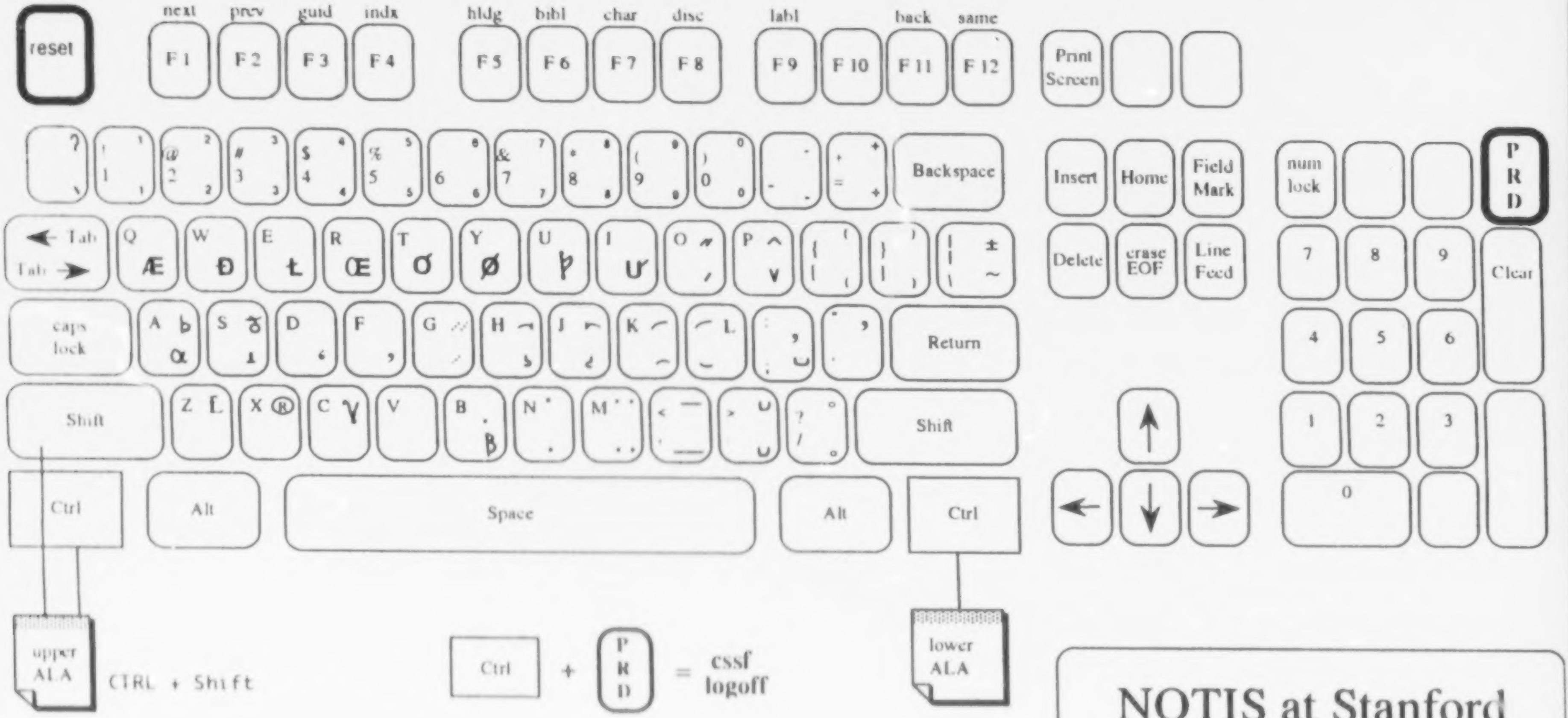
Your own training: Spend considerable time learning how to use this new computer. If you don't have one on your desk, be sure to schedule time on the training room computers so that you are comfortable with the depth of knowledge necessary for the rudimentary staff training. Attend the short training session in Systems on Stanford/SUL-specific software.

User Training: Every user should have spent sufficient time on the training room computers to have gone through the Windows tutorial. This is best accomplished in groups of 5 or 6. You can call Systems to reserve use of the room. Plan approximately 1 hour. The idea here is to get people some introduction before they actually go to the training and get their new computers.
Users who will miss their assigned training need your help to get hooked up for training with another group, and will need some special help if their computer arrives before their training. Discourage this as much as you can!!

File Backup: Work with the users to backup any files from their old computers that will need to be transferred to their new ones.

Attitude: Be Positive! Be Encouraging! You will calm many of your users' fears by focusing on the positive aspects of this change, and by sharing your discoveries of the possibilities that can open up with this new equipment.

Jane and Maureen


reset
next
prev
guid
indx
hldg
bibl
char
disc
labl
back
same
F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11
F12
Print Screen
Backspace
Insert
Home
Field Mark
num lock
P R D
Tab
Delete
erase EOF
Line Feed
Clear
caps lock
Return
Shift
Shift
Ctrl
Alt
Space
Alt
Ctrl
upper ALA
CTRL + Shift
Ctrl
+
P R D
= cssf logoff
lower ALA

NOTIS at Stanford

2-20-95

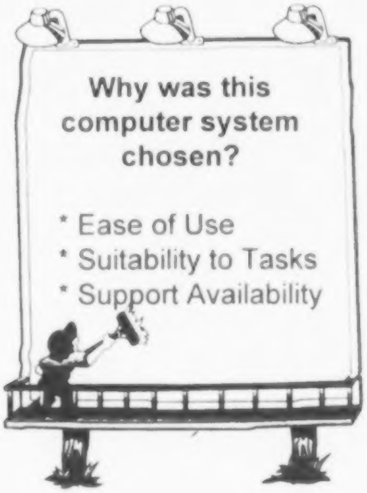
Q	low	up	*AE digraph*
O	low	up	*acute & double*
F	low		*alif*
A	low		*alpha*
/?		up	*angstrom*
D	low		*ayn*
B	low		*beta*
.>		up	*breve*
; :	low		*candrabindu*
H	low		*cedilla*
J	low		*cedilla - right*
/?	low	up	*circle - low/hi*
P		up	*circumflex*
' "		up	*comma - hi cntr*
; :		up	*comma - off cntr*
W	low	up	*D with crossbar*
N	low	up	*dot - low/hi*
B		up	*dot - at mid-line*
M	low	up	*dot - dbl - low/hi*
S		up	*eth*
C		up	*ġamma*
` ~	low		*grave*
P	low		*hacek*
HJ	up	up	*hook - left/right*
S	low		*I - dotless*
E	low	up	*L - barred*
KL	up	up	*ligature - lft/rt*
.<		up	*macron*
G	low		*miagkii znak*
,A		up	*musical flat*
T	low	up	*O - hooked*
Y	low	up	*O - slashed*
R	low	up	*OE digraph*
X		up	*patent mark*
\\|		up	*plus or minus*
Z		up	*pound sign*
` ~		up	*pseudo question*
1 0	low	up	*sub/supr scrpt 1 0*
- _	low	up	*sub/supr scrpt minus*
= +	low	up	*sub/supr scrpt plus*
[{	low	up	*sub/supr scrpt (*
] }	low	up	*sub/supr scrpt)*
U	low	up	*thorn - Icelandic*
\ |	low		*tilde*
KL	low		*tilde - dbl - lft/rt*
G		up	*tverdii znak*
I	low	up	*U - hooked*
M		up	*umlaut*
, <	low		*under score*
.>		lo	*upadhmaniya*

YALE UNIVERSITY LIBRARY
A Short Networking Glossary
compiled by Duane Harbin
September 1994

Internet	A huge, international network of computers which communicate using a common *protocol*, *TCP/IP*.
protocol	A defined convention for exchanging electronic data between computers. A protocol is generally analogous to a "language." Protocols may also be subordinate parts of a larger protocol. In these cases, they are analogous to "dialects" or "argots."
TCP/IP	Transmission Control Protocol/Internet Protocol. The particular protocol suite which is the common language of the Internet.
client/server architecture	A system design scheme which organizes computer transactions into two roles: *server* and *client*, and allows the creation of protocols for doing routine tasks. A major advantage of client/server architecture is that computers with completely different hardware can work together. Another is that placing redundant servers on the network can keep services available even if a particular computer or portion of the network fails.
server	A computer which, by running a software program, takes on the role of providing a particular service on the network (e.g. maintaining a database, providing terminal services for a mainframe, distributing electronic mail). The server "listens" on the network for queries directed to it from *clients*. While server is primarily used to refer to the software program, it is sometimes used for the computer running the software.
client	A computer which, by running appropriate software, is able to utilize network servers. The client transmits requests to servers, and interprets their responses. Client software packages can take advantage of the strengths of the particular hardware and operating systems they run on. Client is also used to refer both to the software program and to the computer running it.
host	A computer connected to the network. Host refers to the computer rather than to the software running on the computer, though it is sometimes mistaken for a synonym for server. A given host may be both a client and/or a server. In fact, a host may run several different types of client and server software at the same time.

Telnet	A client/server protocol that allows a client computer to connect via the Telnet server to a computer which expects to communicate with standard ANSI terminals. Telnet usually functions as a VT100 terminal.
TN3270	A special "flavor" of Telnet for IBM mainframes and their clones. IBM mainframes expect to communicate with a 3270 terminal device, rather than an ANSI terminal.
Internet Name, IP Address	Each computer on the Internet has both an Internet Name and an IP address. The Internet Name is an alphanumeric string of words separated by "dots" (i.e. periods). The name is usually made up of somewhat mnemonic abbreviations (e.g. yalevm.cis.yale.edu, rlg.stanford.edu, compuserv.com). The IP Address is a string of digits delimited by dots which provides a unique, hierarchical address for each host (e.g. 130.132.21.132 which is the IP address for the Yale MIS mainframe). In order to connect to any server on the Internet, it's necessary to configure the client software with the IP Address of the server. If only the Internet Name is available, it's necessary to get the IP Address from a Name Server, which functions as a directory of IP Addresses.

Welcome to Your Workstation



Introduction

Your new workstation is a personal computer (PC) which allows you to communicate with Orbis and RLIN, write correspondence and perform other tasks at one machine. Highlighted below are features of the workstation that will make your work easy and fast.

Graphical User Interface (GUI)
Your computer and you communicate using small pictures, or **icons**. By activating an icon you tell your computer which program to run or give it other commands.

The Mouse
The **mouse** makes moving around your computer screen easy. You perform tasks by two basic mouse actions - **clicking** and **dragging**.

Multi-tasking
You can have several different programs running at the same time; this is called **multi-tasking**. Your workstation allows you to switch easily from program to program.

Network System
Your computer allows you to communicate directly with other computers or databases at Yale, such as Orbis. Via the Internet, you can even communicate with computers around the world.

Graphical User Interface (GUI)

Your computer screen displays small pictures, or **icons**, which you use to communicate with your computer. Icons can represent many things, including programs, computer commands, or computer elements such as drives.

Program Icons

McGill Communications Program

FrEdit (Yale Record Editor)

Command Icons

Print Command

Copy Tool

Drive Icon

Floppy disk drive

The Mouse

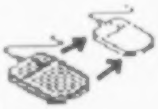
The mouse allows you to easily control the cursor, activate an icon, or manipulate text. By sliding the mouse over your desk, you move the cursor across the screen.

Basic Mouse Actions

Click. Quickly press and release the mouse button.

clicking once can:
- change the cursor position,
- *select* a program icon or drive icon, or
- *activate* a command icon or toolbar icon.

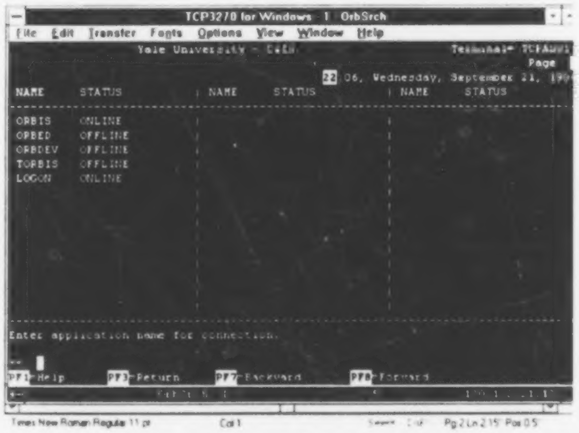
clicking twice can:
- *activate* (run) a program icon, or
- *open* files.



Drag. Press and hold down the mouse button while you move the mouse. Dragging higlights an area on the screen, and is used for manipulating text (deleting, copying or moving), moving icons, and moving windows.

Multi-tasking

Your workstation operates in the **Windows** environment. One of the features of Windows is the ability to run several programs or multiple sessions of one program (see example below) at one time. This **multi-tasking** allows you to search an item in RLIN and copy information from there directly to Orbis without logging-out of either session.


TCP3270 for Windows 1 OrbSrch
File Edit Transfer Fonts Options View Window Help

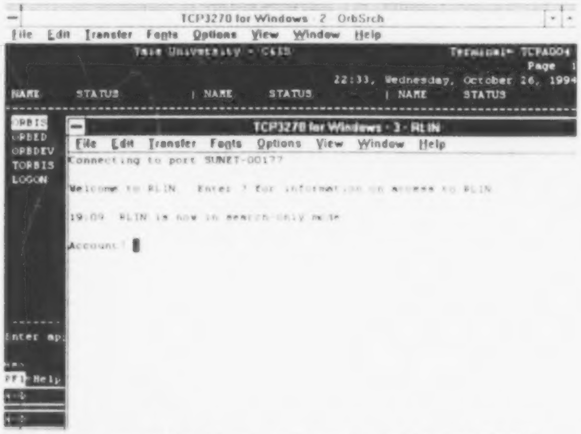
```
                  Yale University - CAIS                       Terminal= TCPAUUI
                                                                            Page
                                             22:06, Wednesday, September 21, 199
NAME      STATUS              | NAME      STATUS            | NAME      STATUS
--------------------------------------------------------------------------------
ORBIS     ONLINE              |                             |
ORBED     OFFLINE             |                             |
ORBDEV    OFFLINE             |                             |
TORBIS    OFFLINE             |                             |
LOGON     ONLINE              |                             |

--------------------------------------------------------------------------------
Enter application name for connection.

==> 
PF1=Help       PF3=Return       PF7=Backward       PF8=Forward
```

Times New Roman Regular 11 pt
Col 1
Pg 2 Ln 2.15" Pos 0.5"

This is an example of one session - OrbisSearch - active and displayed on the computer screen.


TCP3270 for Windows 2 OrbSrch
File Edit Transfer Fonts Options View Window Help
TCP3270 for Windows 3 - RLIN
File Edit Transfer Fonts Options View Window Help

```
                  Yale University - CAIS                       Terminal= TCPA004
                                                                            Page 1
                                             22:33, Wednesday, October 26, 1994
NAME      STATUS              | NAME      STATUS            | NAME      STATUS
--------------------------------------------------------------------------------
ORBIS
ORBED
ORBDEV
TORBIS
LOGON
```

```
Connecting to port SUNET-00177

Welcome to RLIN.  Enter ? for information on access to RLIN

19:09  RLIN is now in search-only mode

Account?
```

This is an example of two sessions - Orbis and RLIN - open and displayed on the computer screen at the same time. The front window (RLIN in this example) is the "active" window.

Network System

Your workstation is connected to the Yale campus **Ethernet** network which gives you access to Yale databases, such as Orbis, as well as access to the **Internet**, an international computer network. Your workstation also runs a program called **Windows for Workgroups**, which allows you to share files and printers within your unit.

Yale Ethernet

Workstation	Workgroup	Ethernet (Campus-wide and World-wide)	
Wordprocessing	Shared Files	Orbis	RLIN
Spreadsheets	Shared Printers	YaleVM (E-mail)	YaleInfo (Gopher)

BEST COPY AVAILABLE

Set-up Checklist for the Yale Library Windows Workstation

Staff Version

DECpc LPv+ 466d2 with DOS 6.22 and WWG 3.11 and 8MB RAM
DEC 15" model PCXBV-PC monitor

Systems Office
Yale University Library
October, 1994

DOS and Windows

- Use preconfigured CONFIG.SYS and AUTOEXEC.BAT files tailored for the workstation
- Set video refresh rate to 72Hz -- 800x600 Non-Interlaced
  - Copy SMTR.EXE (the Set Monitor program) from the DEC S3 Video Utilities diskette to C:\ and type "SMTR" at the DOS prompt (exit from Windows first)
- Set video to 800x600 with 256 colors in Windows Setup
  - (64K colors is preferable but the DECpc LPv+ 466d2 does not support this option with the selected resolution and refresh rate. The 800x600 resolution is required if you wish to display a full NOTIS workscreen in McGill TCP3270 with all diacritics correctly drawn)
- Adjust monitor screen size and position to occupy full screen
- Make sure the DOS mouse driver is properly installed
- Create a directory for temporary files if you don't already have one: C:\TEMP
- Create a Permanent Windows Swapfile at least 8100KB in size, 32-bit disk access on, 32-bit file access on, Cache Size = 2048
- Enable Power Management Features: Monitor Suspend = 20 min, Off = 30 min
- Set NumLock at Boot to OFF (System BIOS Setup)
- Install appropriate printer drivers in Windows (at least the HP DeskJet 500)
- Configure barcode wand
- Install preconfigured "Yale Library Workstation" group in Program Manager
- Minimize other program groups
- Consolidate "Applications", "Digital", and "Microsoft Tools" groups into one "Tools & Utilities" group
- Add SYSEDIT to Main Group in Program Manager (at least for expert users)
- Remove Dr. Watson from Startup Group (if present)
- Turn off "Save Settings on Exit" for Program Manager
- Install WordPerfect for Windows 6.0a
- Create a directory for your WordPerfect documents (C:\YALEDOCS) and set this new directory as the WordPerfect default (File, Preferences, File, Documents/Backup)
- Set date and time
- Set colors, background, screensaver (5 min delay) to suit individual
- Adjust mouse tracking speed, double-click speed, left/right buttons to suit individual

Windows for Workgroups

- Install Windows for Workgroups Networking (Network Setup icon in Network Group)
- Add Microsoft TCP-IP as a new protocol (provides WinSock support)
- Enable file and printer sharing (Network Setup icon in Network Group)
- Enroll workstation in appropriate WorkGroup (Network icon in Control Panel)
- Enable WinPopup and Network Log (Network icon in Control Panel)
- Enable File Manager tool bar
- Create a directory for shared documents (C:\SHARED) and share the directory on the network
- Test file sharing
- Test printer sharing

Implement standard drive assignments for shared resources (File Manager)
Connect to SOSERVER\WORKSTN and install library software over the network
Install and test *Teach Me Windows* Tutorial
Install and test LC Cataloger's Desktop CD-ROM

TCP3270 for Windows (McGill)

Make sure you are using version 2.50 dated August 24, 1994
Enable ALA, alternate keyboard, clear key, field-mark key, side-by-side diacritics for staff
Make sure Convert Nulls to Blanks is turned OFF (Display Preferences)
Turn ON the Type Ahead option (Preferences)
Turn ON Entry Assist and Word Wrap for the YALEVM email session (Entry Assist)
Change File Transfer Block Size from 4088 to 1022 (for use with YALEVM)
Install TPRINT macro and TPRINT button for YALEVM
Change Mouse Select Mode from Rubber Band to Reverse Video (Cursor Options)
Create an AutoStart Macro to assign a fixed terminal ID
Use -A parameter to suppress initial "Credits" screen
Use -P parameter to link a profile to a particular icon
Add logon / logoff macros to green and red light button-bar icons (Tool Bar Options)
Add Print-Raw-LPT1 to Tool Bar (Use footprint icon)
Use "Book Orbiting Globe" icon for Orbis (from FREDIT.EXE)
Install FrEdit 2.0.1 dated October 18, 1994 for RLIN-to-Orbis record transfer
Add the YtermALA font to the Windows font list (Control Panel - Fonts)
Set colors, screen position, font (Preferred font = TT Courier New, Regular, 10 Point)
Enable large button bar (Double click at far right of button bar)
Create profiles, macros, hotspots, poppads
Customize keyboard and button bar to suit individual

Training

Windows Tutorial (on HELP menu): Mouse, Windows basics
Teach Me Windows Tutorial (from ATI): Wide variety of Windows features
Classes at Computer Center or in the Library
Printed instructions and cheat sheets
Locally developed automated tutorials for Yale procedures, McGill, FrEdit, etc.
How to format a diskette in Windows
How to create a directory in Windows
How to copy files in Windows
Shortcut commands such as [ALT][TAB] and [CTRL][ESC]
Explain backup procedures using vendor-supplied Windows backup utility
Explain multi-tasking and multiple communications sessions
Exit to DOS prompt before turning off power or rebooting
Turn off power at the end of the day
Machines must be TURNED OFF before using plastic dust covers!

Essential Configuration Details for the Yale Library Windows Workstation

DECpc LPv+ 466d2 with DOS 6.22 and WWG 3.11 and 8MB RAM – September, 1994

Important: **Install Windows for Workgroups Networking (Network Setup) and Microsoft TCP-IP software before using these configuration files!**

CONFIG.SYS

```
*1*    DEVICE=C:\DOS\HIMEM.SYS                            |These 3 lines
       DOS=HIGH,UMB                                       |must come FIRST
*1*    DEVICE=C:\DOS\EMM386.EXE NOEMS                     |in this order!
       FILES=40
       BUFFERS=10
       LASTDRIVE=Z
       STACKS=9,256
       BREAK=ON
       SHELL=C:\COMMAND.COM C:\ /P /E:1024
       DEVICEHIGH=C:\DOS\POWER.EXE ADV:REG
WG     DEVICE=C:\WINDOWS\IFSHLP.SYS
```

AUTOEXEC.BAT

```
WG     C:\WINDOWS\net start
       @ECHO OFF
       PATH C:\;C:\DOS;C:\WINDOWS
       PROMPT $P$G
*2*    SET TEMP=C:\TEMP
       SET WINPMT=Type EXIT to return to WINDOWS! $P$G
*3*    LOADHIGH C:\MOUSE\MOUSE CENHANCE
*4*    LOADHIGH C:\DOS\SMARTDRV.EXE /X 2048 128
       WIN          ["WIN :" suppresses display of logo during startup]
```

NOTES

WG Windows for Workgroups Commands.

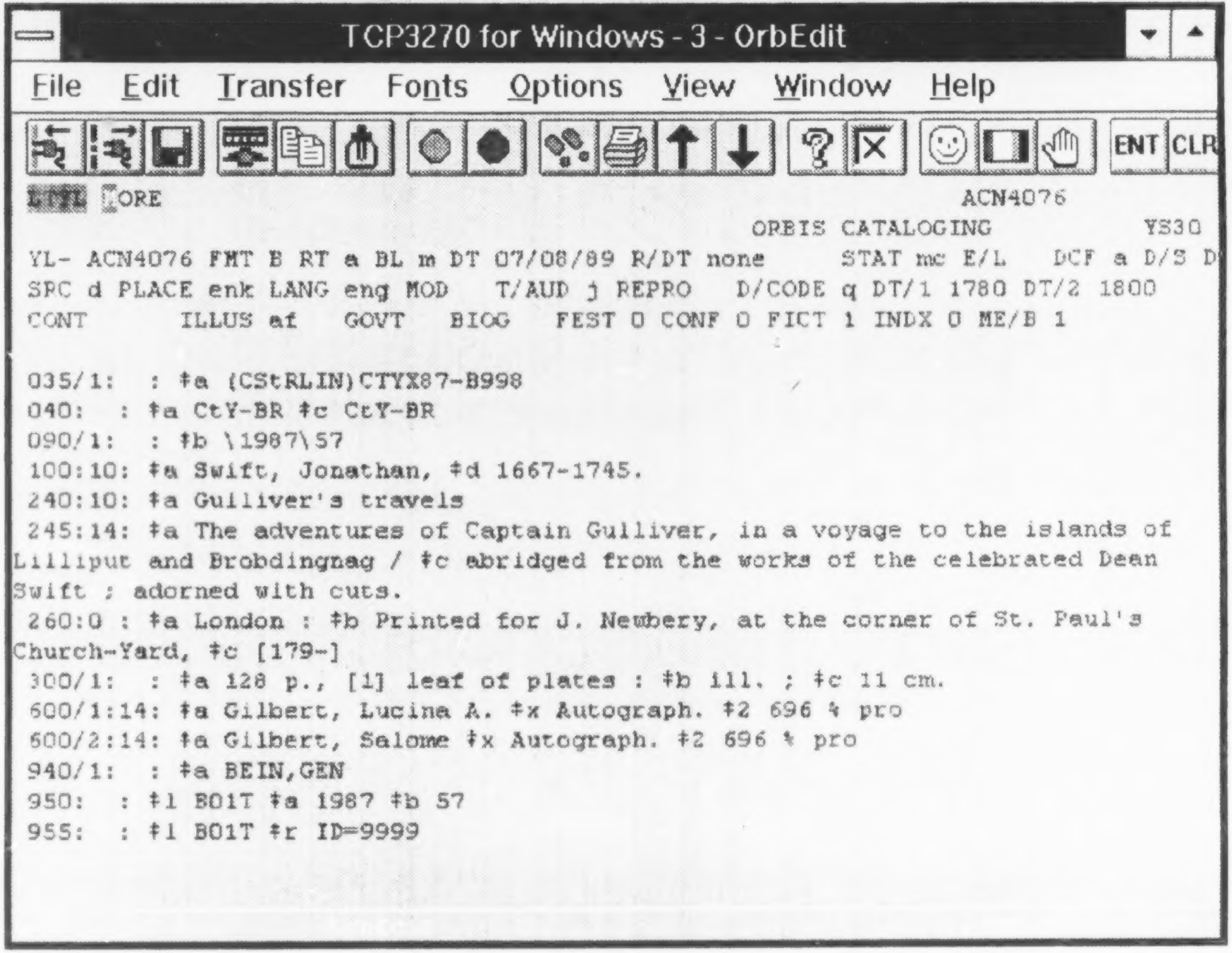
1 It is important to use the most recent version of these programs. With earlier versions of DOS, substitute "WINDOWS" for "DOS".

2 Check to make sure the directory C:\TEMP exists on your hard drive.

3 Make sure that MOUSE.COM exists in the MOUSE directory. If not, use this line: LOADHIGH C:\WINDOWS\MOUSE.COM /Y

4 The parameters "2048 128" are automatically added here when you activate 32-bit disk and 32-bit file access in Windows for Workgroups (Control Panel -- 386 Enhanced -- Virtual Memory). Make sure you have a Permanent SwapFile at least 8,100 KB in size. There should be "X" marks for the 32-bit disk and file access options and a Cache Size of 2048. Use the "Change" button to adjust settings. Close all Windows programs beforehand! With earlier versions of DOS, substitute C:\WINDOWS\SMARTDRV.EXE for C:\DOS\SMARTDRV.EXE.

Sample McGill Session


TCP3270 for Windows - 3 - OrbEdit
File
Edit
Transfer
Fonts
Options
View
Window
Help
ENT
CLR

```
LTYL CORE                                                ACN4076
                                       ORBIS CATALOGING          YS30
YL- ACN4076 FMT B RT a BL m DT 07/08/89 R/DT none     STAT mc E/L   DCF a D/S D
SRC d PLACE enk LANG eng MOD   T/AUD j REPRO   D/CODE q DT/1 1780 DT/2 1800
CONT       ILLUS af    GOVT    BIOG    FEST 0 CONF 0 FICT 1 INDX 0 ME/B 1

035/1:  : ‡a (CStRLIN)CTYX87-B998
040:  : ‡a CtY-BR ‡c CtY-BR
090/1:  : ‡b \1987\57
100:10: ‡a Swift, Jonathan, ‡d 1667-1745.
240:10: ‡a Gulliver's travels
245:14: ‡a The adventures of Captain Gulliver, in a voyage to the islands of
Lilliput and Brobdingnag / ‡c abridged from the works of the celebrated Dean
Swift ; adorned with cuts.
260:0 : ‡a London : ‡b Printed for J. Newbery, at the corner of St. Paul's
Church-Yard, ‡c [179-]
300/1:  : ‡a 128 p., [1] leaf of plates : ‡b ill. ; ‡c 11 cm.
600/1:14: ‡a Gilbert, Lucina A. ‡x Autograph. ‡2 696 ‡ pro
600/2:14: ‡a Gilbert, Salome ‡x Autograph. ‡2 696 ‡ pro
940/1:  : ‡a BEIN,GEN
950:  : ‡1 B01T ‡a 1987 ‡b 57
955:  : ‡1 B01T ‡r ID=9999
```

Terminal to Pentium Conversion Procedures

1. Remove Orbis terminal
2. Physically Install PC, Printer, and Wand
3. DEC Setup/Registration, Printer Installation, and Wand Configuration
4. Monitor Setup
5. Network Setup
6. Network Drive Connection to SOServer
7. New Autoexec.bat and Config.sys Files
8. Install Mcgill, Hgopher, Uwterm, and FrEdit
9. Copy Groups and .INI Files
10. Install Wordperfect
11. Add McGill Username to Net3270.ini (McGill ini file)
12. Copy/Setup Winsock Software
13. Setup New Groups
14. Install New Fonts
15. Customize Windows
16. PC ID sticker
17. Inventory Info (both PC and terminal)

Supplies:
- sleeves and ID labels
- wand cables
- wand configuration sheets
- printers/printer cables
- IP addresses
- McGill user names for fixed IDs
- WFWG diskettes with drivers for ethernet bds (Diskettes 7 &8)
- Word Perfect manual(s) and templates
- Change of Status forms
- screwdriver
- magic marker
- tape

1. Remove Orbis Terminal:

a. Turn off terminal.

b. Unplug terminal from wall socket.

c. Disconnect monitor from base of terminal.

d. Disconnect printer cable from printer and terminal.

e. Disconnect blue gandalf box or cigarette gandalf box from terminal. Follow the cable to wall jack and disconnect it.

f. Disconnect keyboard.

g. Disconnect wedge reader cable from wedge reader and terminal.

h. Clean monitor.

i. Clean area.

j. Staple the Terminal ID card to the Conversion Form.

k. Note the Yale Sticker # on the Terminal ID card and Change of Status Form.

l. Discard terminal base and keyboard.

m. Save monitor, blue gandalf box/cigarette gandalf box, and printer cable for Systems Office.

n. Save wedge reader/wand and printer to be attached to PC.

2. Physically Install PC, Printer, and Wand:

a. Unpack pc logic unit, monitor, and various cables.

b. Following instructions on setup card in bag:

Attach monitor base to monitor. (For monitor info, see the monitor manual in bag. The inside of the manual's back cover has a diagram showing how to mount the monitor on its base.)
Set monitor on logic unit and attach monitor cable to logic unit.
Plug monitor power cable into logic unit.
Attach keyboard to logic unit.
Attach mouse to logic unit.
Using new parallel cable, attach printer to logic unit.
Plug computer into electric socket.
Remove stickers from PC.

c. If have wand, use new cable to attach keyboard to wand and wand to logic unit.

d. Insert ethernet cable into logic unit.

3. DEC Setup/Registration, Printer Installation, & Wand Configuration:

a. If preferred, set numlock to off at startup **(follow procedures exactly)**:

Turn on PC.
As PC is starting, press F2 when see message "press f2 to enter setup".
At setup options screen, use down arrow to move to and highlight "Keyboard Features." Press Enter.
At keyboard features screen, first feature, numlock, is already highlighted.
Press Space Bar twice to change "auto" to "off".
Press Escape to exit to main screen.
Press Escape again to exit setup.
At exit screen, "save changes and exit" will be highlighted. Press Enter.
PC will resume start up.

b. Personalize PC

After PC has completed startup, DEC Welcome screen will appear. Click ok.
Getting Started screen will appear. Click personalize.
When prompted, enter your unit's name and Yale University Library. (Unit name should be standardized for all PCs in unit.)
When prompted to Restart, click "no".

c. Printer installation:

Back at Getting Started screen, click on second button, "printer setup".
Use scroll bar to move through list of printers (bottom box) until find printer type attached to your pc.
Double click on printer type to install printer or single click and then click install button on right.
Printer type should appear in box headed "installed printers" and should be followed by words "on lpt1".
If you are asked for diskette with drivers, call Systems Office.
Click close.

d. Wand configuration:

Wand barcodes on wand configuration sheets.
Wait for beeps between barcodes.

e. Exit DEC setup:

Click on Remove from Startup at bottom of screen.
Click on ok.
Click on icon to right of Exit to Windows text at bottom of screen.

f. DEC registration:

(This is **optional**. If desired, complete later, after installs are done. You will be put on mailing lists and receive a free (small) mouse pad.)

Click on Celebris Getting Started icon in Main group. Click ok; then, click on User Registration button and follow instructions.

4. Monitor Setup:

Follow these procedures exactly, especially in part b. If you have any questions, stop and call the Systems Office. You can skip this section, and do it later with someone from the Systems Office.

a. Set video refresh rate:

Exit Windows by double clicking on control box in upper left of Program Manager window.

At C: prompt, type "cd s3_util" and press Enter.

At new prompt, type "smtr" and press Enter.

Monitor selection box appears. Use arrow keys to move to the choice - "800 x 600 75 hz". Press Enter.

You will be asked if you want to save. Type "y".

You will probably receive an error message. Don't worry. Click ok to return to monitor selection box. Press Enter again. When asked if you want to save, type "y" again.

You will be returned to DOS prompt. Type "win" to return to Windows.

b. Set monitor to 800x600 64K colors:

Double click the Windows Setup icon in the Main group.

The "Windows Setup" window appears. Pull down the Options menu and select "Change System Settings".

"Change System Settings" window appears. Use arrow at right of "Display" line scroll through monitor choices.

Scroll to "S3 864 ... 800x600 [2 MB 64K?] colors LF". Click on that line to select it.

Click ok at bottom of "Change System Settings" window.

You will be asked whether you want to use the current driver or install a new one. **Click "Current" button.**

You will be prompted to restart Windows. Do so.

c. Adjust monitor size:

Adjust size of visible monitor screen by following instructions in the monitor manual. Remember to save changes as manual instructs.

5. Network Setup:

a. Double click on Network program group. Double click on Network Setup icon.

b. Network Setup window will appear:

Single click "Networks..." button.
Networks window will appear. Single click in empty circle next to words "Install Microsoft Windows Network."
Click ok.

c. Back at Network Setup window, click on Sharing button. Sharing window will appear. Click both empty boxes to enable file sharing and printer sharing. Click ok.

d. Back at Network Setup window, click on Drivers... button. Network Drivers window will appear.

e. Single click Add Adapter button. Add Network Adapter window will appear.

f. Double click on "3COM Etherlink III" or single click and press Enter. PC will return to Network Drivers window. Click close and PC will return to Network Setup window. Click ok.

g. PC will prompt you for user name, workgroup, and computer name. (PC will have filled in user and computer names based on info entered during the DEC setup.)

Type user's full name over text in User Name box.
Tab to Workgroup box and type unit's workgroup over the word "workgroup".
Tab to Computer Name box and type user's last name over text in box.
Click ok or press Enter.

h. The Install Drivers window will appear and prompt for Microsoft Windows for Workgroups diskette 7. (At this stage, you are loading a "driver" to run the network card.) Put diskette 7 in the floppy drive.

i. In the box with "C:\install", replace "C:\install" by typing "a:". Press Enter.

j. PC will begin to copy software off floppy diskette. When box monitoring progress reaches approximately 50%, you will be prompted for diskette 8. Insert diskette 8 and, again, replace text "C:\install" with "a:" **Be careful not to pull any floppies out while the green light on the floppy drive is on**.

k. When copying of driver files is complete, you will see a message that autoexec.bat and system.ini files have been changed and the old ones backed up. Click ok.

l. In box prompting you to restart, click "restart computer" button. (**Remove diskette from floppy drive.**) Computer will restart and return to Windows.

m. When prompted for password, type user's first name and press Enter.

n. When asked if want to create password list file, click yes or press enter.

o. You will be asked to confirm password by retyping it. Do so and press Enter.

p. The Program Manager will come back up. Close Network window, if still open.

6. Network Drive Connection to SOServer:

a. Open File Manager (double click on icon in Main program group).

b. Pull down "Disk" menu from top row and select "Connect Network Drive."

c. Connect Network Drive window will appear. Scroll through "Show Shared Directories On" box until you find the SML workgroup and the SOServer.

d. Double click on SOServer.

e. "Shared Directories on SOServer" will appear in lower box. Scroll to bottom of list and double click on "workstn."

f. You will be prompted for a password. Before typing password, deselect "Save this password in your password list", by clicking once in the box to the left of these words. The x should disappear.

g. Type password provided by Systems Office and press Enter. (Current password (3/95) is)

g. A window showing new drive D: will appear. Pull down Windows menu and select "tile horizontally" so can see contents of both C and D drives simultaneously.

56

7. New Autoexec.bat and Config.sys Files:

a. Switch C drive window to root directory (single click on C:\ folder at top left of C drive window).

b. Locate autoexec.bat file in D drive window. "Drag" its icon to C window and "drop" it. (Single click with mouse on icon and hold mouse button down as you move mouse to where you want icon; release mouse button when you have reached spot you want to "drop" icon.) Drop icon in white space on right of C drive window.

c. You will be asked to confirm the operation. **Make sure message says you will be copying file to "C:\".** Click yes. (If message says copying to something other than C:\, click no and try again or consult Systems Office.)

d. Repeat drag and drop procedure with config.sys.

(On one PC in unit, as backup, original config.sys and autoexec.bat files should be renamed before copying the new config and autoexec. Systems Office staff assisting in install will usually do this.)

8. Install Mcgill, Hgopher, Uwterm, and FrEdit:

a. On directory half of D drive window, single click on Fredset folder.

b. Directory contents will appear on right. Double click on **setup.exe** icon.

c. You will be prompted to confirm directory for installation. Do so by clicking "continue" button.

d. FrEdit files will be copied from SOServer to local PC. A message that installation is complete will appear. Click ok.

e. Program Manager will appear with File Manager behind it. Click anywhere on File Manager to make it the active window (bring it to the front).

f. Repeat procedure with Gophset, Mcgilset, and Uwtrmset. Always click **setup.exe** (ignore setup1.exe, if it is present).

g. When you copy uwterm, there will be a cryptic warning message. Click ok - it is not a problem

h. When you have finished copying all four programs to local PC, Program Manager will again have come up with File Manager in the background. Click anywhere on File Manager window to make it active.

9. Copy Groups and .INI Files:

a. Change C drive window to Windows directory by scrolling through list of directories on left and single clicking Windows to select it. (C drive window will then say "C:\Windows\*.*" on its top line.)

a. On the directory half of D drive window, single click on folder with unit's name.

b. Directory contents will appear on right. Drag and drop all the files to your windows directory. (There will probably be two files ending in .grp and one or two files ending in .ini.)

10. Install WordPerfect 6.1:

a. Follow direction in section 6, "Network Drive Connection to SOServer", but this time connect to the directory "wp61." The password will be supplied by the Systems Office.

b. The window for the new drive will appear. Files appear on right. Double click on the **setup.exe** icon.

c. As install begins, you will be given several choices. Select the defaults (hit return at each screen). When you are asked for type of install, select **"standard"** (not "network".)

d. Close the connection to WordPerfect directory on SOServer by selecting Disconnect Network Drive... from Disk menu. When Disconnect Network Drive window appears, click on appropriate drive to disconnect and click ok.

96

11. Add McGill Username to Net3270.ini (McGill ini file):

a. The Windows directory should still be the current directory in your C: drive window. (C drive window will say "C:\Windows\*.*" on its top line.) If this is not the case, scroll through list of directories on left and single click Windows to select it.

b. Content of Windows directory will appear on right. Scroll through list of files until you find Net3270.ini.

c. Double click on Net3270.ini. This file will open up in Notepad (text editor software).

d. Click on Search menu and then click on Find command. In Find window, type "mcgl" (without quotation marks) and press Enter.

e. The Net3270.ini file should move to "default.mac" section where macros are stored and highlight "MCGL" at the start of the autoconn macro. Click on cancel to make the Find window disappear.

f. Replace the "xxx" in "MCGLxxx" with number supplied by Systems Office. (It is these unique numbers which allow each OrbEdit session to have a unique fixed ID.)

g. Close Notepad window by double clicking control box at top left.

h. You will be prompted to save your changes. Do so by clicking "yes".

h. Minimize File Manager by clicking down triangle in extreme upper right of window. You will be back in Program Manager.

12. Copy/Setup Winsock Software:

a. Open Network program group; double click on Network Setup icon.

b. Network Setup window will appear. Single click on "drivers".

c. Network Drivers window will appear. Click on Add a Protocol button.

d. Add Network Protocol window will appear with "unlisted or updated protocol" highlighted. Click ok.

e. Install Driver window will appear. Type "D:\mstcpip" over the "a:\". Click ok.

f. Unlisted or Updated Protocols window will appear with Microsoft TCP/IP 32 3.11 listed and highlighted. Click ok or press enter.

g. Network Setup window will appear as files are copied from SOServer to local PC.

h. After copying, you will be returned to the Network Drivers window. **Highlight "Microsoft TCP/IP 32 3.11" in the Drivers box by clicking on it.** Click "setup" button on right.

i. Microsoft TCP/IP Configuration window will appear. Fill in information listed below. Pressing tab or clicking with the mouse will move you to next box. Use arrow keys to move within a box (Boxes allow three numbers between periods; if you are only entering two numbers, use the arrow key to move over.):

IP Address: (provided by Systems Office)
Subnet Mask:
Default Gateway: (provided by SO; in SML)

j. Click DNS button on right to reach additional fields to be filled in.

At top, in Domain Name box, type **"Library.yale.edu".**

Domain Name Servers (type these in the order specified by C&IS):
type click add button
type click add button
type click add button

click in Domain Suffix box:
type click add button
type click add button

k. click ok to return to MS TCPIP Config window; **doublecheck IP address.**
click ok to return to Network Drivers window
click close to return to Network Setup window
click ok

l. A message that files have been changed and old ones saved will appear. Click ok.

m. Restart the computer when prompted. Logon when prompted.

n. Close Microsoft TCP/IP-32 and Network program group windows, if open.

13. Setup New Groups

a. Close any open groups.

b. Click once on "Yale Library Workstation" group icon to select it.

c. Press Delete key. (Delete key won't work if little menu box has come up. If it has, click again to get rid of it, or use "delete" command from File Menu.)

d. You will be asked to confirm you want to delete. Check this message to make sure you are deleting the right group. If so, click yes. If not, click no and try again.

e. Repeat the deletion procedures from step "b" for the Microsoft Tools group, Digital group, and Applications group.

f. Pull down File menu and select New.

g. The New Program Object window will appear. Make sure "Program Group" is selected and click ok.

h. The Program Group Properties window will appear. Tab to "group file" line and type "C:\windows\tools.grp".

i. Click ok. The Tools and Utilities program group icon will appear minimized in the Program Manager.

j. Repeat this procedure from step "f", and for "group file" type "C:\windows\ylwrkstn.grp".

k. The open Yale Library Workstation group window will appear.

14. Install New Fonts

a. Open the Control Panel in the Main group by double clicking on it.

b. Open the Fonts icon in Control Panel by double clicking on it.

c. Fonts window will appear. Click "Add" button.

d. Add Fonts window will appear. In lower left, you will see C:\,' with "windows" below it and "system" below that. Double click on "system" and fonts will load and appear in upper box.

e. Click "ALA Courier...". Hold down Control key and click "ALA Lucida...". Keep Control key down, scroll to end of font list, and click "YtermALA...". Release control key. (You will have selected three fonts - ALA Courier, ALA Lucida, and YtermALA. The control key lets you select noncontiguous items.)

f. Click ok.

g. Fonts will be installed and you are returned to Fonts window. Click Close.

h. You will be back in the Control Panel.

15. Customize Windows

a. Click on Color icon. Select Color Scheme "The Blues", or whatever the user prefers. Click ok to return to Control Panel.

b. Still in the Control Panel, click on Desktop icon. Select pattern "diamonds", screen saver "Starfield Simulation", and wallpaper "none", or whatever the user prefers. Click ok to return to Control Panel.

c. Select Date/Time icon. Change date and time if necessary by selecting and typing over existing info. Click ok to return to Control Panel.

d. Select Network icon. Single click the Startup button at bottom. Click in box next to Enable WinPopup. Click ok to return to Network window. Click ok to return to Control Panel.

e. Select Enhanced 386 icon. Single click on Virtual Memory button. Single click on Change button. In Change window, click to select both 32 bit disk and file access and increase cache to 2048. (32 bit access may already be selected.) In New Size box, just above 32-bit file access, type 20000. Click ok multiple times, and restart windows, when prompted.

f. Log back in after startup. Close Control Panel.

g. Back in Main group, select Power Management icon. In Power Management window, click in box next to Power Management enabled. New boxes will appear; enable Monitor Suspend and select 20 minutes for timer and 30 minutes for Monitor Off. Click ok to return to Main group. Close Main group.

h. Open Options menu and deselect "Save Settings on Exit."

i. Arrange icons and open windows the way they should come up every morning.

j. Hold down the shift key and double click the Program Manager control box (in the upper left) to save this "look".

k. Click each icon in the Yale Library Workstation group to make sure it works.

When you access OrbEdit, log on to Orbis and make sure the correct terminal ID appears in the upper left. (Remember to logoff to close the connection!)

When you test Wordperfect, make c:\yaledocs the default directory by selecting Edit menu, Preferences, File, and typing "c:\yaledocs" over "c:\office\wpdocs." You will be prompted to create yaledocs. Click ok.

l. Test the printer.

m. Open File Manager in Main group. Make sure there is a c:\temp directory. Use Create Directory from File menu to create one if there isn't.

n. Select Disconnect Network Drive... from Disk menu and disconnect D drive. Close File Manager.

16. PC ID sticker

Fill in IP address, Orbis ID, ethernet circuit #, and serial #.

Place sleeve on PC and card in sleeve.

17. Inventory Info

When receive Yale inventory sticker, place it on PC. Forward completed accompanying form to Systems Office.

Please call Systems Office (2-1849)
if you have any problems or questions!

Workstation Software

or

How to Make Sense of What's on Your Computer

Introduction

Your workstation has the following software:

Operating System and Environment
DOS 6.2 (Disk Operating System)
Microsoft Windows for Workgroups 3.11

Local Applications
Word Processing (Write or WordPerfect 6.1)
Windows Accessories
FrEdit

Network Applications
McGill 2.5 (TCP3270)
UWTerm .097 (Telnet)
HGopher 2.4

Your computer has physical parts called ***hardware***, which include a monitor, a keyboard, and a processor (CPU). Your hardware runs ***software*** - programs, or applications, which are a series of detailed, basic instructions telling the computer how to perform a variety of functions. Various programs have been loaded into your computer and are stored on the hard disk.

The Operating System and Environment

Disk Operating System

Every computer needs an **operating system**. Your computer uses MS-DOS (Microsoft Disk Operating System). Though you may not see it, the operating system is always running while the computer is on. The operating system manages the flow of information to and from the various parts of your computer system. MS-DOS responds to a particular set of commands, but you will rarely use these since your computer also has an easy to use **operating environment**, called Windows. With your PC you have received a manual with information on DOS, Windows, and Windows for Workgroups.

Windows for Workgroups Operating Environment

Window for Workgroups (WFW), a graphical **operating environment**, runs on top of DOS, making the computer easier to use and providing greater functionality and flexibility. All of the programs for the standard library workstation operate in the WFW environment, so understanding the basic features of WFW will drastically reduce the time and energy needed to do your daily tasks. Some of the advantages that WFW offers are the following:

- Graphical User Interface (GUI) or icons
- Multi-Tasking
- Standardized Format

Local Applications

Word Processing

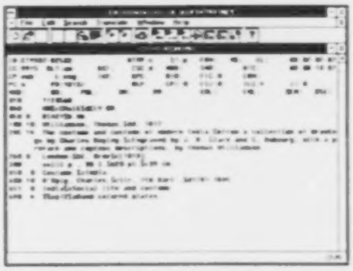
Each workstation has a word processing application in which you can type, edit, and print documents. Some machines may run Write, a word processing application that comes with Windows for Workgroups. Other machines will include WordPerfect 6.1 for Windows.

Windows Accessories

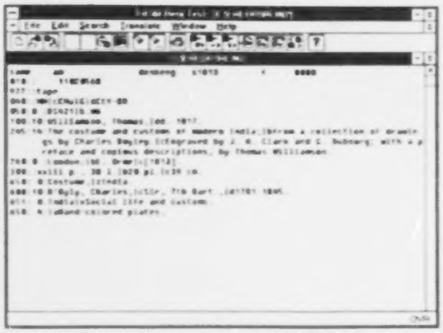
Windows comes with a variety of accessory applications such as a clock, a calculator, a calendar, and Paintbrush (used for creating drawings). Since these accessories follow the basic Windows format, they are easy to learn and use. They are found in the Accessories Program Group in the Program Manager. Experiment, one may be just the program you need!

FrEdit

FrEdit is a locally developed program which converts RLIN records into the Orbis format. After copying an RLIN record into FrEdit, the user activates the editing function which translates the RLIN format to the Orbis format. FrEdit saves time and energy!



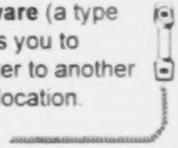
Step 1 - Copy RLIN record into FrEdit.



Step 2 - Activate the Translate RLIN function. The record is then converted into the Orbis format.

Network Applications

Telecommunications software (a type of network application) allows you to directly connect your computer to another computer, often at a remote location. When you are connected, it is as if your keyboard is sending commands directly to that remote computer. You can access whatever services or information that remote machine provides. Possibilities include running interactive sessions, looking at library catalogs, receiving news updates, or sending messages to people at other libraries. Your workstation has two telecommunications software packages - **McGill** and **UWTerm**.



McGill

McGill (TCP3270), developed at McGill University in Canada, is a **telecommunications** software package that uses the TN3270 protocol. It enables your computer to communicate over a network with other computers, such as Orbis, RLIN, and YaleVM. When McGill connects your computer to remote computers or hosts, you can utilize many features including:

- ALA character set support
- Multiple-session capabilities
- Keyboard customization
- Screen customization

UWTerm

Since McGill does not provide a full VT100 emulator, which is required to communicate with certain remote computers, your workstation includes UWTerm (a telecommunications software package that uses the Telnet protocol) to communicate with machines that must use full VT100. UWTerm does not include all the features of McGill, particularly ALA support.

HGopher

Gopher is a menu-driven program that allows you to explore resources and information available on the Internet. **How it works** - First, Gopher helps you **locate** the resource by guiding you through a series of menu options. Once you arrive at a desired location, Gopher helps you **access** the resource by moving it into Notepad (a Windows accessory) if it is a text file or opening McGill or UWTerm if it is a remote computer connection. The Gopher program on your workstation is called HGopher. It is setup to access YaleInfo, Yale's campus-wide information system.

SPEC

SYSTEMS AND PROCEDURES EXCHANGE CENTER

ERGONOMICS DOCUMENTATION

ASSOCIATION OF RESEARCH LIBRARIES OFFICE OF MANAGEMENT SERVICES

Harvard College Library
Ergonomics Program
and Policies

Prepared by
The Standing Committee on Ergonomic Issues and Policy

January, 1996

Table of Contents

INTRODUCTION 1

RIGHTS AND RESPONSIBILITIES OF THE INDIVIDUAL EMPLOYEE 4

RIGHTS AND RESPONSIBILITIES OF THE SUPERVISOR 6

RIGHTS AND RESPONSIBILITIES OF THE ADMINISTRATION 8

PERSONNEL PROCEDURES 9

PROBLEM RESOLUTION PROCEDURES FLOW CHART 11

APPENDIX A: Computer-Related Injuries 12

APPENDIX B: Work Station Design 18

APPENDIX C: Eye Exam and Glasses Policy 21

APPENDIX D: Guidelines for Purchasing Ergonomic Items 23

APPENDIX E: EH&S Workstation Evaluation Program 25

APPENDIX F: Workers' Compensation Procedures 31

APPENDIX G: Standing Committee on Ergonomic Issues and Policy 33

INTRODUCTION

On December 30, 1991 the Harvard College Library Joint Councils issued a report entitled Ergonomic Issues in the Workplace in response to the growing need to address the problems posed by ergonomic hazards in the workplace. One of the recommendations of this committee was that a Standing Committee on Ergonomic Policy be formed to report to the Associate Librarian of Harvard College for Administrative Services regarding

> "development, assessment and policy for those employees whose jobs involve VDT [Video Display Terminal] use; the collection and dissemination of current knowledge relating to ergonomic issues; the identification of future ergonomic issues and the interaction with the Joint Councils and other appropriate planning groups when ergonomic or technological changes present themselves or are contemplated."[1]

The new committee, formed in August 1992, investigated a number of possible ways to set an agenda in conformance with this charge and reached a consensus that a policy document should be its first priority. The Joint Councils had taken a major first step in issuing their report, but a separate document outlining HCL policies was deemed necessary. There were two reasons for this decision: first, policy questions not addressed in the report needed identification and elaboration; and second, the nature of the report was such that questions of policy were combined with other matters such as planning and goals for the introduction of new equipment. It is the objective of the present document to serve as a program for HCL and to replace the previous report of the Joint Councils where questions of policy arise.

Although the Committee was formed to recommend policy for "those employees whose jobs involve computer use," the Committee became aware in the course of its deliberations that the concept of ergonomic safety extends to other types of jobs as well. There are large numbers of HCL staff who engage in activities such as lifting, shelving books, barcoding, wanding or working with various types of machinery. For these people the procedures for requesting site visits from Environmental Health and Safety and the problem resolution process are the same, but the policy says little about the proactive measures that can be taken to prevent injury. However, staff members are given instruction in non-computer ergonomic issues at the Ergonomics Workshops conducted for new staff members, and in 1993 the University established a Committee to look at ergonomic issues of all types.

In the appendixes dealing with Repetitive Stress Injuries and work station design, this policy aims to give a general explanation of the issues involved in RSIs and computer workstation design. These are complicated and sometimes controversial issues about which even experts are in disagreement. For this reason the Committee has refrained from making specific recommendations and instead places the emphasis on providing information regarding the proper way to seek information and treatment from the specialists on campus, as well as delineating the steps to be followed in the case of workstation problems or injury.

---

[1] Ergonomic Issues in the Workplace : a Report presented by the HCL Joint Councils, December 1991.

The first three sections list the rights and responsibilities of the three groups involved in the entire ergonomics process, the individual employee, the supervisor and the administration. Both proactive measures and the proper response to specific problems are covered and references are made throughout to the various offices that individuals may turn to for assistance in assuring that the safety concerns of all parties are addressed.

Since HCL Personnel Services plays such an important role in the problem resolution process and acts as a liaison between HCL staff members and the various University Offices to which individual cases are referred, a separate section is provided which explains the procedures it follows. This section is especially important since it is necessary for all parties concerned to understand the role that HCL Personnel Services plays and proceed in a way that allows Personnel to maintain the essential coordination among individuals and offices.

Following the HCL Personnel Services Procedures is a flow chart representation of the problem resolution procedures. This chart is intended as a quick overview of the entire process as described in the various sections of this document.

Finally, the appendixes provide information on the policies and programs of the College Library and University offices with responsibilities related to the issues of workplace ergonomic safety.

In addition to the policies of the Harvard College Library, guidelines are issued by Harvard University and regulations are promulgated by the United States Occupational Safety and Health Administration. It is the intent of this policy to be in conformity with the standards of both, to exceed their recommendations when it is deemed necessary for our specific situation, and never to mandate a standard that falls short of their guidelines and rules. Consequently, it may be necessary to update this document in the event that new guidelines are issued by either or both.

All members of the Harvard College Library should receive copies of this document. HCL Personnel Services, Widener Library, Room 190, will maintain supplies of the document and distribute it as appropriate.

We would like to thank the following people for taking time out from their busy schedules to come and meet with the Committee and for the invaluable advice they shared with us in helping to formulate this policy: Nancy Barbour (Environmental Health and Safety, Harvard University), Jen Hines (Disability Claims Unit, Office of Human Resources, Harvard University), Susan Lee (Associate Librarian of Harvard College for Administrative Services), Bob Rush (Harvard Union of Clerical and Technical Workers), Hazel Stamps (Director of Personnel Services, Harvard College Library), and Kay Zevitas (Director of Facilities Management, Harvard College Library). We would also like to thank Adrienne Landau (Office of Health Education, Harvard University Health Services) for providing documentation relative to Repetitive Stress Injuries and Judith Mansfield of the Library of Congress for sharing with us the results of the work done by LC's Workplace Ergonomics Program Coordinating Committee.

We would also like to thank the following staff members who served on the Committee during the creation of this policy but were not members at the time of its completion: Jeffrey Cronin (Littauer Library), Richard Fay (Kummel Library), Julia Hendon (Tozzer Library), and Janet Vitkevich (Widener Library).

Standing Committee on Ergonomic Issues and Policy

Pam Hays (Widener Library)
David Pfarrer (HCL Automation)
Lisa Plosker (HCL Personnel Services)
Lynn Sayers (Lamont Library)
Bruce Trumble (Chair) (Widener Library)

Rights and Responsibilities of the Individual Employee

- To participate in Harvard College Library (HCL)-sponsored training in ergonomic issues and practices.

- To follow sound ergonomic practices at work. If possible, tasks which do not require repetitive motion should be integrated into the work day for at least 15 minutes every 2 hours. If engaged in work involving extended repetitive activity, such as keyboarding, the employee should take brief pauses for muscle relaxation and eye relief throughout the day.

- To take regular rest breaks as provided by HCL policy.

- To receive instruction and training in the proper set-up and use of all job-related equipment. To report problems promptly to the supervisor.

- To report promptly to the supervisor any discomfort or pain associated with the carrying out of the employee's job duties or any work-related ergonomic problems. To work with the supervisor to try to resolve the problem locally. If the problem cannot be resolved locally, the supervisor must contact Personnel Services. Every attempt should be made to respond to these problems as quickly as possible. Non-exempt employees may inform a union representative.

- To request a site evaluation by a member of Environmental Health and Safety (EH&S). The purpose of the site evaluation is to identify problems in work station design, equipment use, and/or the work environment (including issues of light and temperature) which may cause discomfort or lead to injury to the employee. EH&S will recommend changes to eliminate or reduce the risk of such injury. HCL Personnel Services coordinates the evaluation, which is attended by the employee, the supervisor, and a Personnel Representative (see section on Personnel Procedures).

- To follow through on recommendations of EH&S, such as suggestions regarding proper posture, task lighting, eye exams, etc.

- To request supplies[2] as needed to alleviate ergonomic problems. The purchase of new equipment recommended by the EH&S site evaluation must be approved by the supervisor and the department before purchase (see Appendix D). The employee may expect that every effort will be made to provide this equipment in a timely manner.

- To pursue problems of work station design, job tasks, or possible injury directly with Personnel Services if, after following the above steps, the situation is not resolved to the employee's satisfaction. The employee may need to fill out an Accident Report as part of this process.

- To seek medical advice quickly if the employee feels that he/she may be injured.

- To obtain in writing specific recommendations by the medical provider for modification of the employee's work routine and to present it to the supervisor and Personnel Services.

- To record all time lost from work due to ergonomic injury (see Appendix F). The Personnel Procedures section contains detailed instructions on how to proceed in case of injury. Appendix C states HCL's eyeglasses policy and outlines the procedure to follow when experiencing eye discomfort.

---

[2] HCL distinguishes two categories of materials based on price. Supplies are relatively low-cost items such as glare screens, wrist rests, footrests, copyholders, terminal platforms, and task lighting. Requests for such items should be made to the supervisor but do not need special approval. Equipment refers to more expensive items such as chairs and work stations and specialized keyboards. Requests for such items [illegible]

The Rights and Responsibilities of the Supervisor

- To provide the initial orientation and instruction in proper ergonomic procedures, including demonstration of chair height, keyboard usage, etc.

- To encourage newly hired staff members to attend the Harvard College Library (HCL) Ergonomics Workshop. Supervisors must provide release time to enable staff members to attend.

- To participate in ergonomic education and training.

- To govern work flow of their unit to enable all staff members to schedule breaks according to HCL policy and to vary their work routine as needed to avoid lengthy periods of repetitive activity.

- To request and attend an ergonomic work site evaluation performed by Environmental Health and Safety (EH&S) when occasion demands. This request may be initiated by a staff member or the supervisor (see section on Personnel Procedures and Appendix E).

- To identify and attempt to correct work practices or situations that may lead to injury. In the event of a possible repetitive stress injury, the supervisor must contact Personnel Services and see that Personnel Services' procedures are followed (see section on Personnel Procedures).

- To purchase or to recommend for purchase appropriate ergonomic equipment as requested by a staff member and/or recommended by EH&S. Every effort should be made to provide equipment in a timely manner (see Appendix D).

- To take ergonomic considerations into account when designing jobs. Prospective candidates should receive a realistic description of the job design and its ergonomic considerations during the interview process.

- To make every effort to instruct casual workers and student assistants in appropriate ergonomic policies and procedures relevant to their particular tasks.

- To work in coordination with Personnel Services and in consultation with affected staff members to determine the best course of action in the event of an injury to any person assigned to the unit for which the supervisor is responsible.

- To monitor time lost due to a work-related injury and see that it is recorded correctly, and to notify Personnel Services when time lost has accumulated so reimbursement can be requested from the Disability Claims Unit (see Appendix F).

The Rights and Responsibilities of the Administration

- To provide the leadership and resources necessary to develop and administer an ergonomics program, the goal of which is to minimize physiological and environmental stresses in the workplace and, therefore, optimize the health and safety of staff.

- To form committees and to appoint individuals to those committees. Such committees will deal with ergonomic issues and policy; act as liaisons between the Administration and staff; and review and evaluate the program on a regular basis to ensure that it is in compliance with Harvard College Library (HCL) policies, Harvard University guidelines, and the Occupational Health and Safety Administration (OSHA) regulations.

- To promote the communication and cooperation among library and department heads necessary to establish preventive measures for the reduction of stresses which may be responsible for repetitive stress injuries. Examples of such measures would include job sharing, and job design and redesign.

- To provide ergonomic education and training for both supervisors and employees. Such training should be designed to enable supervisors to fulfill their responsibilities to their staff.

- To participate in ergonomic education and training.

- To apply ergonomic principles in the design and redesign of work units and to consult with Environmental Health and Safety whenever possible during the planning stages.

- To provide funds for the purchase of ergonomic equipment and supplies, including off-cycle purchases (see Appendix D).

- To implement all applicable ergonomic policies.

Personnel Procedures

The Harvard College Library (HCL) is committed to ensuring the health and safety of all of its employees and therefore supports a strong and effective ergonomic program in the workplace. HCL recognizes its responsibility to provide staff and their supervisors with information on and training in appropriate health and safety practices associated with the use of computer terminals and other workplace equipment. In order to achieve this goal, the following procedures must be adhered to:

- Staff members are responsible for sharing in the implementation of the ergonomics program by participating in training and education sessions offered by HCL and for insuring their own safety by following sound ergonomic practices. If an employee is experiencing discomfort due to equipment or job-related activities, he or she must report the problem to his or her immediate supervisor.

- Personnel Services recommends that supervisors try whenever possible to vary the specific job activity, such as extended keyboard use, that is causing an employee discomfort and to assign other activities to lessen the severity of the problem.

- Once a staff member has reported an ergonomic problem to his or her supervisor which cannot be resolved locally, the supervisor must inform HCL Personnel Services, which will make arrangements for a site visit from an Industrial Hygienist in Harvard's Office of Environmental Health and Safety (see Appendix E). The staff member and the immediate supervisor, as well as a Personnel Representative, must attend the site visit.

- Once EH&S has submitted its written report, it is the supervisor's responsibility to follow through with HCL Facilities Management to ensure that any recommended supplies are ordered in a timely fashion. Such supplies may include copy holders, task lights, wrist rests, and so on (see Appendix D).

- If a staff member is experiencing eye discomfort, a referral to the University's Eye Clinic may be necessary (see Appendix C).

- It is the administration's responsibility to provide ergonomically correct equipment and training in its use. It is the employee's responsibility both to use equipment correctly and to notify the supervisor of any problems with its use.

- Supervisors are responsible for overseeing the conditions of the workplace, reviewing job design in light of any changing conditions, and seeing that the individual staff members are given training appropriate to their jobs.

- Personnel Services requires that time lost due to a work-related injury be recorded. It is the supervisor's responsibility to make sure such a record is kept (see Appendix F).

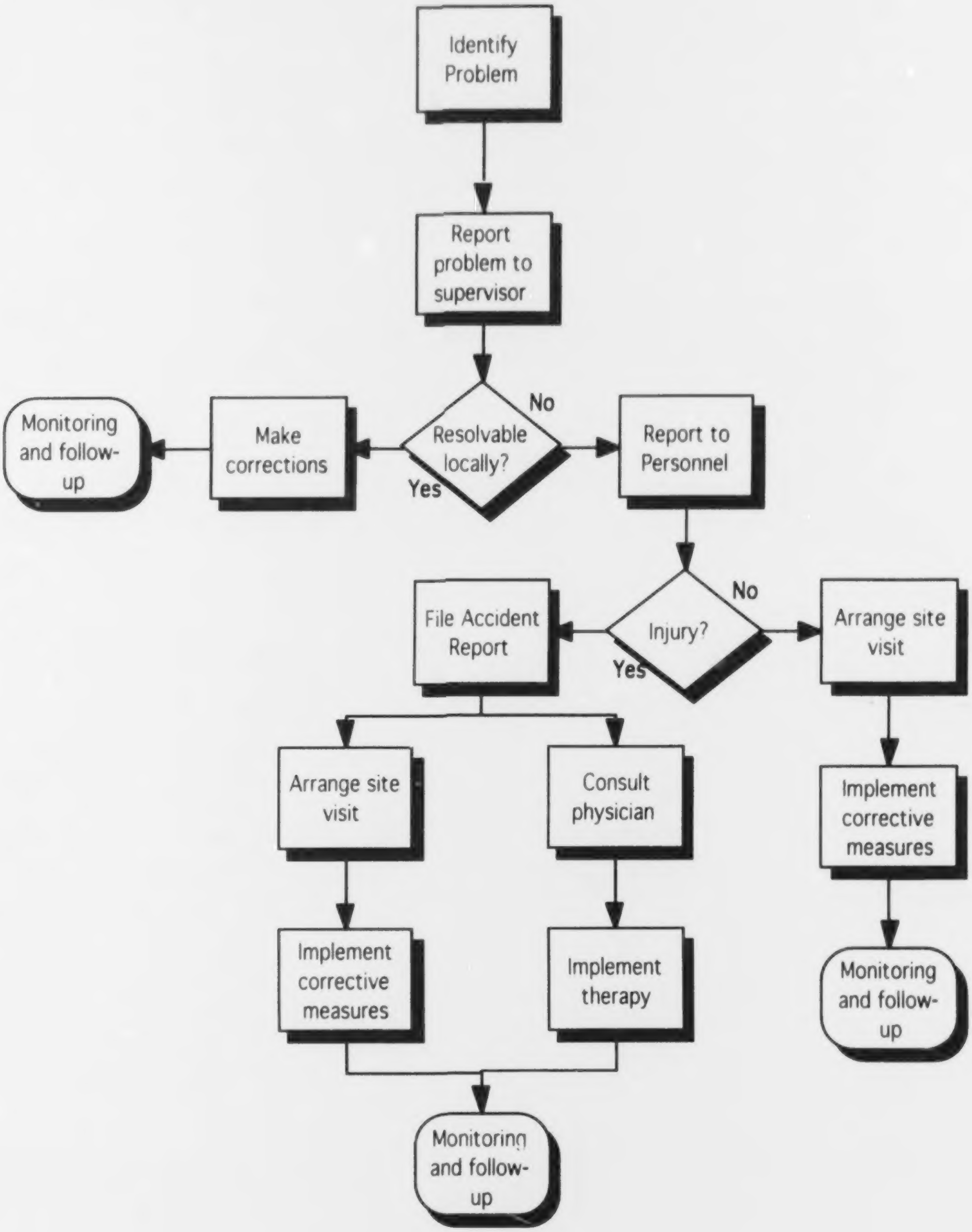
Staff members experiencing discomfort or pain are strongly advised to fill out an Accident Report, which will be forwarded to the University's Disability Claims Unit (DCU), and to visit a physician. The medical provider's recommendations for adjustments to an employee's work patterns or for rest must be submitted in writing to the supervisor and Personnel Services.

Upon notification from the DCU, a person may be eligible for Worker's Compensation as outlined by the policies and guidelines of the University's Benefits Committee (see Appendix F). All cases that involve five or more days of lost time from work due to disability, which can include repetitive stress injuries, are assigned to a consultant in the DCU for case management. This involves ongoing contact with the department, claimant, medical provider(s), and a rehabilitation specialist if necessary, to secure a reasonable and timely resolution.

LIGHT DUTY ALTERNATIVE PROJECT WORK

In the event that a staff member is advised by their physician to significantly limit or refrain totally from the use of a computer terminal, HCL Personnel Services will make every attempt to solicit temporary alternative project work from departments within the HCL in accordance with the physician's stated recommendations. Such work will involve non-terminal work and will be deemed temporary until the person is able to return to their regular job and/or upon completion of the specific project. Light duty alternative project work may come from a variety of sources and will be reviewed periodically.

Problem Resolution Procedures


Identify Problem
Report problem to supervisor
Resolvable locally?
No
Yes
Make corrections
Monitoring and follow-up
Report to Personnel
Injury?
No
Yes
File Accident Report
Arrange site visit
Arrange site visit
Consult physician
Implement corrective measures
Implement corrective measures
Implement therapy
Monitoring and follow-up
Monitoring and follow-up

APPENDIX A

COMPUTER-RELATED INJURIES

Repetitive Stress Injury

I. DESCRIPTION

Cumulative trauma disorders (CTDs), including repetitive stress injuries (RSIs), are disorders of the musculoskeletal and nervous systems which may be caused or aggravated by repetitive motions, forceful exertions, vibration, mechanical compression, sustained or awkward posture, or exposure to noise over an extended period of time.

CTDs can affect nearly all tissues - the nerves, tendons, tendon sheaths and muscles, with the upper extremities being the most frequently affected. These injuries develop gradually over a period of weeks, months, and years and result from repeated actions such as twisting and bending the hands, arms and wrists. A common risk factor among these disorders is the use of force combined with repetitive motion over time.[3] The most common types of injuries associated with computer workers are the repetitive stress injuries carpal tunnel syndrome and tendinitis. One reason these problems seem so common today is that the nature of the work performed in offices has changed so drastically, especially with the advent of automation. Whereas in the past work often required the use of the entire body performing a variety of tasks, today's jobs often entail the performance of highly focused tasks which are limited to a small number of movements executed by a small number of muscles and tendons. The worker maintains unchanging body postures and performs repetitive motions for long periods of time, often over the entire workday. This overuse of a limited number of body parts can lead to injury.[4]

CTDs can cause a variety of symptoms, and these symptoms may be difficult to detect, especially in the early stages. If any of the following symptoms occur, a medical professional should be consulted. This is not intended to be an exhaustive list, but rather an indication of the types of symptoms that commonly occur:

- Burning pain during noncomputer time, particularly during sleeping hours.
- Localized pain or dull ache, with or without movement.

---

[3] Barbour, Nancy. Computer Science Newsletter 5/3 (November 1994), p. 2.

[4] Hebert, Lauren Andrew, The Neck-Arm-Hand Book: The Master Guide for Eliminating Cumulative Trauma Disorders from the Work Place (Bangor, ME: IMPACC, 1989), p. 10.

- Radiating pain that travels up and down the arm or shoulder.
- Numbness and tingling.
- Weakness or stiffness.
- Loss of muscle coordination or control.
- Hands or arms that tire more easily.[5]

Carpal Tunnel Syndrome

Deriving its name from the Greek karpos, or wrist, the carpel tunnel is the passageway, composed of bone and ligament, through which a major nerve system of the forearm passes into the hand. The carpal tunnel is like a cable for the median nerve and nine tendons. The nerve supplies sensation and controls the muscles in part of the hand, and the tendons allow the fingers to flex. The wear and tear of repeated movement may thicken the lubricating membrane of the tendons, increasing pressure inside the carpal tunnel and pressing the nerve up against the bone. This process, called nerve entrapment, can be caused not only by repetitive strain, but by bone dislocation or fracture, arthritis, diabetes, or fluid retention (as may occur in pregnancy)--anything that narrows the tunnel and compresses the nerve and tendons. People who work with their hands are at risk for developing Carpal Tunnel Syndrome. Other activities such as piano playing, knitting and racket sports can contribute to the onset of CTDs.[6]

Typical Symptoms

- Numbness, tingling, pain in the wrist and hand (often felt at night).
- Lack of strength in the hand.
- Inability to make a fist, hold objects, or perform other manual tasks.
- Loss of sensation in the hands.[7]

---

[5] Sellers, Don. Zap!: How Your Computer Can Hurt You--And What You Can Do About It (Berkeley, CA: Peachpit Press, 1994), pp. 71-72.

[6] CTS: Relief at Hand, University of California, Berkeley, Wellness Letter 11/4 (January 1995), p. 7.

[7] Barbour, Nancy.

Tendinitis

Although carpal tunnel syndrome receives the major share of media attention, tendinitis is actually the CTD which most often affects computer users. A tendon is the cord that ties the muscle to the bone. Tendinitis is an irritation of a tendon. Overuse of the muscle and tendon can irritate the tendon and cause swelling, and the chemicals which cause the swelling may further irritate the tendon. Tendinitis is especially common at the wrist, elbow and shoulder. Tendinitis of the wrist can contribute to carpal tunnel syndrome.[8]

Typical Symptoms

- Dull ache over the tendon.
- Discomfort with specific movements.
- Tenderness to touch.[9]

II. PREVENTION

There are a number of steps that can be taken to reduce the likelihood of developing a repetitive stress injury. These may be grouped into the following categories:

Workstation design: The issues involved in workstation design are treated in Appendix B.

Proper work habits: Prevention of RSIs includes good posture which means balanced use of muscles, ease of movement, and freedom from pain, not the tension that comes from holding a stiff posture. Preventative exercises that are designed for the purpose of stretching muscles and gaining strength are also helpful. Proper positioning is another means of prevention. In the case of a job entailing keyboarding, this refers to both the correct configuration of the chair and desk and the correct angling of the body to the computer monitor and keyboard. It also means the importance of learning how to position one's hands correctly at the keyboard. Lastly, pacing is important in prevention. When working at a keyboard, one should take brief rest pauses from typing for every hour of work. One break per hour could include stretching and doing non-keyboard activities. Staff members recovering from injuries should follow the advice of their physicians with reference to breaks, exercises, etc. Working in the cold on a regular basis should be avoided because when the hands are cold, blood flow to the wrists is reduced, which can promote RSIs.

---

[8] Hebert, The Neck-Arm-Hand Book, p. 9.

[9] Barbour, Nancy.

Job Design: Jobs should be designed in such a way as to allow the maximum amount of variation possible. Job sharing may also be considered as a way to introduce more variety of tasks into the workday.

Health habits: A person's susceptibility to RSIs may be increased when overall health decreases. Attention to proper diet, adequate sleep, and stress reduction play a role here as in so many other health concerns. In addition, workers should be aware of the types of free-time activities that can contribute to the development of CTDs. Activities such as playing tennis, playing a musical instrument, knitting, along with additional computer work done at home or playing computer games, all have the potential to cause or aggravate an injury.

Medical advice: Early intervention by medical professionals can check the development of an RSI. If symptoms develop consult a physician. Since these injuries are cumulative, one should not use pain-killing medications to cover the symptoms as an alternative to seeking the advice necessary to effect a long-term correction of the problem.

Education: Staff members should participate in the workshops offered by the Harvard College Library and the University. Additional information on all of the above topics can be obtained from Environmental Health and Safety and the Education Office of the University Health Service. In addition, numerous books, periodicals, and on-line resources treat these topics in much more depth than is possible within the context of a report such as this. Since the causes and treatment of RSIs are the object of some controversy even among professionals in the field, it is important to be aware of the various sources of information necessary for making sound decisions concerning both prevention and treatment.

Eyestrain

Eyestrain is one of the most common complaints among computer operators. Routine eyestrain is both normal and temporary, but the risk of eyestrain may be increased by intensive use, inadequate or detrimental lighting, poor monitor adjustment or preexisting eye conditions.

A number of preventative measures may be taken:

Intensive use: The eyes should be refocused every ten minutes or so. In addition, the recommended policy on breaks should be followed. Variation in job design which allows for some less eye-intensive tasks during the course of the workday can also alleviate eyestrain.

Inadequate or detrimental lighting: Workstations and lighting should be arranged to avoid reflections on the screen or surrounding surfaces. Light should be directed so that it does not shine into the operator's eyes when the operator is looking at the screen. Further, lighting should be adequate to enable the operator to see the text and the screen, but not bright enough to cause glare. Normal office lighting can be supplemented by individual task lighting at a workstation if necessary. Task lighting is particularly helpful for computer work since it enables operators to adjust lighting to their individual preferences. Steps should also be taken to reduce the amount of glare present. Glare may emanate from sources of natural light such as windows as well as from artificial lighting. Care should be taken in positioning the terminal in such a way as to reduce glare from office windows. In addition, glare screens can be used to reduce glare from all sources.

Poor monitor adjustment: Computer terminals are equipped with brightness and contrast controls. Research is currently being conducted into the relationship between terminal colors and eyestrain and may provide more guidance in the not too distant future. In general, soft, soothing colors should be preferred over more garish combinations. Finally, the monitor should be positioned an adequate distance away from the operator. A rule of thumb is that the screen should be an arm's length away from the operator and the first line of text should be at or slightly below eye level. The screen and document holder should be the same distance from the eye (to avoid constant changes of focus) and close together so the operator can look from one to the other without excessive movement of the neck or back. The incline of the document holder should be adjustable.

Preexisting eye conditions: The intensity of terminal work may reveal preexisting eye problems that were not apparent under less demanding conditions. If symptoms of eyestrain appear, the staff member should seek appropriate medical advice. Regular eye examinations are recommended even in the absence of symptoms (see Appendix C).

Advice in all of these areas can be obtained from Environmental Health and Safety and are covered during the site visits (see Appendix E).

Sources

Barbour, Nancy. [Untitled] Computer Science Newsletter 5/3 (November 1994), p. 2.

"CTS [Carpal Tunnel Syndrome]: Relief at Hand." University of California, Berkeley, Wellness Letter 11/4 (January 1995), p. 7 (Supplied by the Office of Health Education, Harvard University Health Services)

Hebert, Lauren Andrew. The Neck-Arm-Hand Book: The Master Guide for Eliminating Cumulative Trauma Disorders from the Work Place. Bangor, ME: IMPACC, 1989.

Pascarelli, Emil, and Quilter, Deborah. Repetitive Strain Injury: A Computer User's Guide. New York: John Wiley & Sons, 1994.

Sellers, Don. Zap!: How Your Computer Can Hurt You--and What You Can Do About It. Edited by Stephen F. Roth. An Open House Book. Berkeley, CA: Peachpit Press, 1994.

APPENDIX B

WORKSTATION DESIGN

Modern, desk-top micro-computers, typically a Macintosh or Intel-based PC Clone (and often referred to generically as Workstations) are the focus of much of the concern over ergonomics in the workplace. These machines, now virtually ubiquitous, do represent a risk to some workers, particularly if they are improperly sited, set up or used.

While expert opinions vary over particulars, there are areas of general agreement over the nature of these risks, areas which the library has tried to address in its purchasing and deployment of workstations.

Computers

Computers present two separate areas of ergonomic concern: the danger of Extremely Low Frequency (ELF) radiation from cathode-ray tube (CRT) based displays and the danger of Repetitive Stress Injuries (RSI) from input devices (keyboards, mice, bar-code scanners).

Emissions risks

All electrical devices emit ELF radiation. This applies to common household appliances, to transformers, and even to electrical wiring. There is a great deal of disagreement among experts over the nature and degree of risk such common emissions constitute.

The potential risks of the computer in this area are all associated with the display if it is (as most are) a CRT. Televisions are exactly the same technology and have been in widespread use for forty years, so many experts feel that concerns in this area are unjustified. Nevertheless, manufacturers now market monitors that meet the most demanding criteria available for reducing ELF emissions from CRTs, those set by the Swedish Government. The HCL has been purchasing such shielded monitors exclusively since 1993.

The distance between the user and the CRT has often been the subject of concern and debate. ELF radiation drops off dramatically at a very short distance from the source and the guideline for safe distance from a co-worker's CRT recommended by the Swedish standards, numerous publications, and Harvard's EH&S is 4 feet. EH&S is available to check the radiation levels in any particular workspace.

RSI risks

Keyboarding is the computer-related activity most often associated with RSIs, and the prevention of such injuries is a combination of good work habits (see Appendix A) and properly configured equipment.

Furniture

Furniture, properly designed and set up, is the first step in creating a proper workstation environment. Unfortunately, there is a fair amount of disagreement among ergonomic experts concerning the specifics of both of these activities. That caveat given, the HCL attempts to address these issues as thoroughly as possible.

Desks

It is commonly agreed that the best desk height for keyboarding is not the same as the best height for writing by hand. Standard desk height is 30 inches while 26 inches is typically given as an appropriate height for a computer keyboard. In many cases this effect is achieved by using a keyboard "cutout," a sliding keyboard tray, or keyboard holder on an articulating arm. Each of these has advantages and individual preferences may vary.

Another alternative is to use desks or tables 26 inches high. This has the added advantage of allowing other input devices (mice or bar scanners) to be at the same height as the keyboard.

Chairs

Chairs are another area where individual preferences vary widely. It is commonly agreed that a chair used for computer work should provide firm, stable support of the buttocks, thighs and back.

Keyboards and Accessories

Major manufacturers are now producing various keyboard designs that attempt to lessen the risks associated with intensive keying.

Some accessories that many have found effective in relieving the strain of intensive keyboarding are wrist rests, mouse trays, footrests, copy holders, book holders, and task lighting. Various models are available from the HCL stockroom as well as from outside vendors.

Other risks

Eye Strain

Eye strain is another form of injury that may be associated with long-term computer use. It can result in headaches, blurred or tunnel vision, tired and watery eyes, etc. Eye strain can be reduced by adjustments in lighting, including task lighting and reducing glare by adjusting window coverings or installing a glare screen. Corrective lenses are sometimes indicated to reduce eye strain as well (see Appendix C).

The HCL purchasing office can provide many of the accessories mentioned above. EH&S can be consulted on workstation design and configuration. EH&S can also provide additional information or referrals.

Finally, it should be kept in mind that good workstation design alone is not enough if good ergonomic work habits are not followed.

APPENDIX C

Harvard College Library

Cambridge Massachusetts

Computer Eye Exam and Glasses Reimbursement Program

The College Library has established the following procedures for worksite evaluation and eye examination for staff members experiencing eye discomfort suspected to be from computer use. Staff members experiencing difficulty should:

A. Notify their immediate supervisor.

B. Immediate supervisor notifies **HCL Personnel Services, 5-3721.**

C. HCL Personnel Services will arrange to have Environmental Health & Safety inspect the worksite and evaluate it with respect to environmental/ergonomic factors which may be contributing to the staff member's eye problems.

D. Upon completion of the worksite evaluation:

  1) If an eye examination is recommended, EH&S will inform and notify both the staff member and HCL Personnel Services in writing of their findings and recommendations;

  2) EH&S will place the staff member's name on the schedule to be examined at the UHS eye clinic;

  3) HCL Personnel Services will contact the staff member and instruct the staff member as follows:

    a/ Staff member will make his/her appointment for an eye exam with Dr. Hardenbergh, UHS Eye Clinic, 5-2056;

    b/ HCL Personnel Services will issue an interdepartmental invoice for payment to cover the cost of the eye exam ($25.00);

    c/ Staff member will report to HCL Personnel Services results of eye exam and recommended treatment, if any.

E. If eyewear for computer use is recommended, the College Library will pay for the costs of the prescription in accordance with the following guidelines:

1) Prescriptions must be filled by the UHS Optical Shop in the Pharmacy in Holyoke Center;

2) Staff member will submit to HCL Personnel Services a receipt from UHS Optical Shop for the glasses chosen;

3) HCL Personnel Services will issue an interdepartmental invoice that includes the cost of lenses and fifty dollars towards the cost of frames up to a maximum of $100.00. NOTE: FOR STANDARD SINGLE VISION GLASSES PRESCRIBED FOR COMPUTER USE, THE UHS OPTICAL SHOP OFFERS A "VALUE PACKAGE" WHICH INCLUDES LENSES AND FRAMES FOR $100.00; FOR BIFOCALS: $130.00.

F. Regular eye care and vision maintenance are the responsibility of the staff member. After the first eye examination and/or eye glass reimbursement, subsequent requests to HCL Personnel Services for eye examinations and eye glasses will be honored only if they are based on new findings of work-related/environmental causes, as identified by Environmental Health and Safety.

APPENDIX D

Guidelines for Purchasing Ergonomic Items

All purchasing of ergonomic equipment/supplies is handled by the Purchasing Assistant or the Director of Facilities Management for Harvard College Library (HCL) in Widener Library Room 80. The stockroom carries a supply of ergonomic items which can be obtained on request.

The following are recommended ergonomic items:

Ergonomic furniture and supplies:

Computer Workstations with adjustable keyboard drop trays are available from Data-Mate in Nashua, New Hampshire. There are 4 sizes: 30"H x 30"L, 30"H x 36"L, 30"H x 48"L, 30"H x 60"L. You have the option of a left-handed, right-handed or center keyboard drop (recommended height of 26 inches). The left-hand and right-hand keyboard drop desks allow sufficient workspace on one side of the work station. Workstations without keyboard drops are also available.

If your computer keyboard sits on top of a standard work table, an additional Keyboard Drawer may be added underneath the desk for more comfort.

Three types of Ergonomic Chairs are recommended for HCL. Office Pavilion in Boston sells the Herman Miller chair which has a wide seat, adjustable height and back. Steelcase chairs are purchased through Offices Unlimited, Inc. (OUI) in Lexington. The two types of Steelcase chairs which are most common in Widener are: the Sensor chair, which has a bucket seat, height and chair angle adjustment; the Concentrix chair, which has a two-piece seat (back is separated from the seat, unlike the Sensor chair), is also fully-adjustable. The seats of the Steelcase chairs are narrower than those of the Herman Miller chairs. All chairs are available with or without arms.

Staff members have alerted us in the past that they have experienced pain and discomfort in their wrists from reading barcodes with the original barcode wands, which had to be drawn across an entire label to read it. Over the past few years we have been substituting these wands with new CCD scanners, which require merely holding the scanner over a label eliminating virtually all wrist motion. A small supply of this Barcode Scanning Equipment is kept in the stockroom to serve as backup for scanners that break.

Other ergonomic supplies, including glare screens, wrist rests, footrests, copyholders, terminal platforms, task lighting, back cushions and monitor arms can be ordered through the HCL Purchasing Assistant. At the time of this writing, requests for items costing over $100.00 should be approved by the department head.

APPENDIX E

Environmental Health and Safety (EH&S) Workstation Evaluation Program

(Provided by Nancy Barbour, Assistant Industrial Hygienist, Environmental Health and Safety, Harvard University.)

The program described in this appendix dates back to the early 1980's when the computer began to replace the typewriter in the modern day office. The program was authored by the University's Industrial Hygienist, based upon the latest scientific literature available on this subject at the time. The references used in developing the program were from the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH) and the American National Standards Institute (ANSI).

The current ergonomic program is essentially the same as when it was first authored. The program consists of providing information packets to individuals, conducting individual video display terminal (VDT) workstation evaluations, and offering group training sessions to members of the University community. These services are provided upon request.

Group training is provided when a large number of individuals in the same department request information at the same time. The emphasis of the group training is to review good work practices prior to doing individual workstation evaluations. There is no fee associated with this service. There are three people within EH&S who provide this service. Two are located at the Cambridge campus, and the other is located at the Boston campus.

An individual computer workstation evaluation is initiated by Harvard College Library (HCL) Personnel Services at the request of the employee or the supervisor. An appointment is made with an Industrial Hygienist. (See sections on Rights and Responsibilities of the Individual Employee, Rights and Responsibilities of the Supervisor, and Personnel Procedures for more information on requesting a work site evaluation).

- The Industrial Hygienist meets with the staff member, supervisor and a Personnel Representative and collects baseline information on a checklist. An average evaluation takes approximately 20 to 30 minutes. The information solicited is as follows:
  - Building name, department, and room number where the evaluation is conducted.
  - Type of computer used and whether the screen is color or monochrome.

  - Amount of time spent at the computer actually operating it.
  - Whether the person wears eyeglasses.
  - Documentation of any existing health complaints.

- Once this information is recorded, the Industrial Hygienist evaluates the workstation based on the following criteria which have been adapted from literature published by both OSHA and NIOSH:
  - Illumination: This refers to the ambient level of room lighting. It is a subjective measure since light meters are not used to quantify light intensity.
  - Glare: An evaluation is made as to whether or not glare is present, and if so, how it can be corrected. Sources of glare include unshielded windows, inappropriate placement of task lighting, and reflection of room lighting onto the screen (the latter two being examples of indirect glare).
  - Configuration of the computer: Height of the screen and other computer peripherals, and of the chair are evaluated in relation to the physical size of the operator.
  - Other: For every 2 hours of repetitive, static (i.e., sitting in one position for an extended period of time) and/or eye intensive activity, a 15 minute pause should be taken. A pause is defined as other work-related activity that does not involve the muscle group or body part which is to be rested.

- If the person is experiencing eye problems, a referral is made by the Industrial Hygienist to the University Health Services (UHS) eye clinic for an eye exam (see Appendix C for more information on Harvard College Library's eye exam policy).

- If the person reports any existing health complaints, he or she is advised to fill out an Accident Report and to see a physician (see section on Personnel Procedures for more information).

- Lastly, the person is advised to arrange the workstation to reduce repetitive motion as much as possible.

- After the evaluation has been conducted, the Industrial Hygienist issues a report of findings and recommendations. Copies of the report are sent to the person whose workstation was evaluated (original), the supervisor (copy), HCL Personnel (copy), HCL Facilities (copy) and any others with a legitimate need to know, at the discretion of HCL Personnel Services.

- The Industrial Hygienist follows up with those individuals who were referred to the eye clinic to determine if their condition has improved.

- The report includes the following information for each workstation evaluation and/or eye examination referral.

    - Employee's name
    - Building
    - VDT manufacturer
    - Monitor type
    - Evaluation date
    - Report date
    - Information provided
    - Rearrangement of workstation recommended
    - Changes in work practices recommended
    - Changes in environment recommended
    - Referral for eye examination performed
    - Eye examination performed
    - Eyeglasses recommended
    - Possible repetitive motion injury

A copy of the workstation evaluation form used by EH&S follows.

VDT PROGRAM
WORKSTATION EVALUATION

Building: ____________________
Department: ____________________
Room #: ____________________
Operator: ____________________
Contact/Supervisor: ____________________

Evaluation date: ____________________
Manufacturer: ____________________
Screen color: ____________________
HRS/WEEK AT TERMINAL: ____________________
EYEGLASSES __ CONTACTS __ DISTANCE __ READING __ BI/TRI FOCAL __

I. EXISTING HEALTH COMPLAINTS

____
____
____
____

II. EXISTING WORKSTATION CONDITIONS

ILLUMINATION: ____________________
____
____

DIRECT GLARE: ____________________
____
____

REFLECTED GLARE: ____________________
____
____

SCREEN HEIGHT/POSITION: ____________________
____
____

COPY HEIGHT/POSITION: ____________________
____
____

DISTANCE FROM SCREEN: ____________________

____

____

CHAIR HEIGHT: ____________________

____

____

BACK REST HEIGHT/POSITION: ____________________

____

____

KEYBOARD POSITION: ____________________

____

____

OTHER: ____________________

____

____

III. RECOMMENDATIONS

ILLUMINATION AND GLARE

___ DECREASE/INCREASE LUMINATION ____________________
___ ADD GLARE SCREEN ____________________
___ REARRANGE COMPUTER POSITION ____________________
___ REMOVE CONTRAST ENHANCER ____________________
___ TURN UP/DOWN BRIGHTNESS CONTROL ____________________
___ OTHER ____________________

WORKSTATION SETUP

___ RAISE/LOWER SCREEN HEIGHT ____________________
___ RAISE/LOWER COPY HEIGHT ____________________
___ INCREASE/DECREASE DISTANCE FROM SCREEN ____________________
___ RAISE/LOWER CHAIR HEIGHT ____________________
___ RAISE/LOWER BACK REST HEIGHT ____________________
___ PULL IN/OUT BACK REST ____________________
___ RAISE/LOWER KEYBOARD ____________________
___ REARRANGE KEYBOARD POSITION ____________________
___ OTHER ____________________

BREAKS

___ BREAKS SHOULD BE 15 min./2 HRS. OF NON EYE-INTENSIVE WORK.

EYE EXAMINATION

___ REFERRAL FOR EYE EXAMINATION TO UHS CLINIC.

REFERRED TO: ___________
DATE: ___________________

IV. ADDITIONAL COMMENTS:

EVALUATION PERFORMED BY: ______________________________
SIGNATURE: ______________________________

APPENDIX F

Workers' Compensation Procedures

(Provided by the Office Of Human Resources, Harvard University.)

All work-related injuries/illnesses should be reported to the Disability Claims Unit (DCU) regardless of severity. However, it is imperative that the DCU be notified immediately of all work-related injuries/illnesses that involve five or more days of disability (lost time from work). The Massachusetts State Department of Industrial Accidents has established deadlines for notification to them and penalties for non-compliance. The University is fined if it does not file state forms within seven days of the fifth day of lost time due to a work-related disability.

The following procedures are currently in place for all claims involving lost time and all repetitive stress claims, whether or not there is time lost:

- Accident Report must be completed by employee and department immediately following a work-related injury or illness, and filed with Harvard College Library (HCL) Personnel Services, which then forwards the report to the Disability Claims Unit (DCU) at 664 Holyoke Center.

- Information is input into the Workers' Compensation database.

- Claimant is contacted by the DCU to:
    - Research details of claim.
    - Confirm medical treatment.
    - Explain procedures and paperwork.

- HCL Personnel Services is contacted by the DCU to:
    - Research details of claim.
    - Confirm information on Accident Report.
    - Inquire if there are outstanding personnel issues.
    - Determine if claimant was paid for time lost.
    - Obtain copy of job description.

- For less than five days of disability, a procedure is established with the department to confirm a return to work date.

- Medical records are received along with other documentation and reviewed by the DCU to make a determination of appropriateness of the claim. In order to be an accepted Workers' Compensation claim, duties performed in the job must be the major contributor to the documented disability.

All cases that involve repetitive stress injuries or five or more days of lost time from work due to disability are assigned to a consultant in the DCU for case management. This involves ongoing contact with the department, claimant, medical provider(s), and, if necessary, a job rehabilitation specialist who provides assistance with job redesign to secure a reasonable and timely resolution.

APPENDIX G

THE STANDING COMMITTEE ON ERGONOMIC ISSUES AND POLICY

BACKGROUND

The Standing Committee on Ergonomic Issues and Policy was appointed by the HCL Joint Councils in August 1992. The Committee reports directly to the administration of the Harvard College Library through the Associate Librarian for Administrative Services who serves as a liaison. The Committee has no formal reporting relationship with the HCL Joint Councils.

CHARGE

The Committee was appointed to serve as an advisory body to:

Recommend ergonomic policy revisions and updates for consideration by HCL administration.

Advise on basic ergonomic training and orientation.

Develop an awareness of ergonomic issues in the workplace.

Interact with the Joint Councils and other planning groups in the College Library when ergonomic or technological changes are encountered or contemplated.

Coordinate with appropriate University offices and committees.

MEMBERSHIP

The Standing Committee currently consists of eight members of which three are professional/exempt staff and three are support staff; the College Library's Personnel Officer and Computer Support Specialist are ex officio members. The Committee strives for a balanced representation of exempt and non-exempt members and seeks members from as wide a range of HCL libraries as possible. Members are typically added to the Committee on a volunteer basis. The normal term of appointment is three years.

MEETINGS

The Committee generally holds two two-hour meetings per month.

STRUCTURE

The Committee is free to determine a structure with reference to chairs and cochairs, subgroups, etc. according to the nature of its agenda.

University of New Mexico

CHECKLIST FOR ASSESSING COMPUTER WORKSTATIONS

Workstation Site: ______________________________
Evaluation Date: ______________________________

Yes	No	**I. GENERAL ENVIRONMENT**
___	___	walls painted in a matte, non-reflective coating
___	___	furnishings in VDT work environment with matte, non-reflective finish
___	___	floors and ceilings constructed of non-reflective materials
___	___	floors and ceilings covered with sound absorbing materials, especially in printer areas
___	___	acoustic pads in place under keyboards and printers
___	___	loud printers have acoustic hoods and/or are surrounded by sound absorbing partitioning
___	___	workstations at reasonable distances from heating and cooling vents
___	___	if vents are near workstations, they are shielded to divert airflow away from VDT operators (suggested temperature 68-74 degrees F.)
___	___	terminals at proper distance from each other for operator radiation safety (suggest operator positioned four feet from back or side of near-by terminals)
___	___	carpets or mats with antistatic materials (suggested humidity 30-50 percent)

Yes	No	**II. LIGHTING**
___	___	recessed, indirect, baffled, or diffused lighting is used, with indoor light coming from side or behind worker
___	___	dimmed lighting levels for areas in which VDTs are used
___	___	task lights or localized spotlights available to illuminate copy
___	___	blinds, shades, or curtains used to manipulate window light
___	___	if windows are present, VDT screens placed at right angles to them

YES	NO	**III. VIDEO DISPLAY TERMINAL (VDT)**
___	___	display screen tilts and/or swivels
___	___	display characters are clear, undistorted, with good resolution (display screen is clear of dust and blurring smudges)
___	___	display screen positioned to avoid glare
___	___	glare screens available (VDT operator may optionally wear darker colored clothes to reduce glare)
___	___	display screen brightness and contrast controls present; flickers are absent

___ ___ top of display screen is no higher than eye level and bottom is no lower than 40 degrees below eye level

___ ___ VDT operator is positioned approximately 20 inches from screen, 18-28 inch range, with VDT operator preference the determining factor of exact distance

YES NO **IV. WORKSTATION TABLE, SURFACE OR DESK**

___ ___ top of surface is at appropriate height for VDT operator (suggest 27-29 inches)

___ ___ height of table is adjustable

___ ___ if not adjustable, pads or other supports are available to achieve proper heights and gaze and arm angles (upper arms of VDT operator hang vertically, forearm and wrist of VDT operator are parallel the floor)

___ ___ adequate space and freedom of motion for legs and knees under table top

___ ___ table top is roomy enough to accommodate keyboard, screen, copy, document holder and other materials (suggest minimum of 2 feet on one or both sides)

YES NO **V. CHAIR**

___ ___ chair supported by five-legged base for stability

___ ___ chair has casters to provide easy glide without hazard (suggest locking casters for safer performance of exercises at computer workstation)

___ ___ seat pan wide enough for comfort

___ ___ front of seat rounded slightly to ensure good circulation to legs

___ ___ seat upholstered in porous, cloth fabric

___ ___ seat and seatback not rigidly joined together

___ ___ seatback has sufficient lumbar support

___ ___ seatback can be easily tilted forward or backward, preferably from a seated position

___ ___ seat height can be adjusted easily, preferably from a seated position

YES NO **VI. MISCELLANEOUS**

___ ___ document holder is provided that adjusts to height, angle and distance of screen, as needed

___ ___ footrests are provided, as needed

___ ___ wristrests are provided, as needed

___ ___ detachable keyboard

COMMENTS: ______________________________

____

____

Wilkinson/Krug 1993

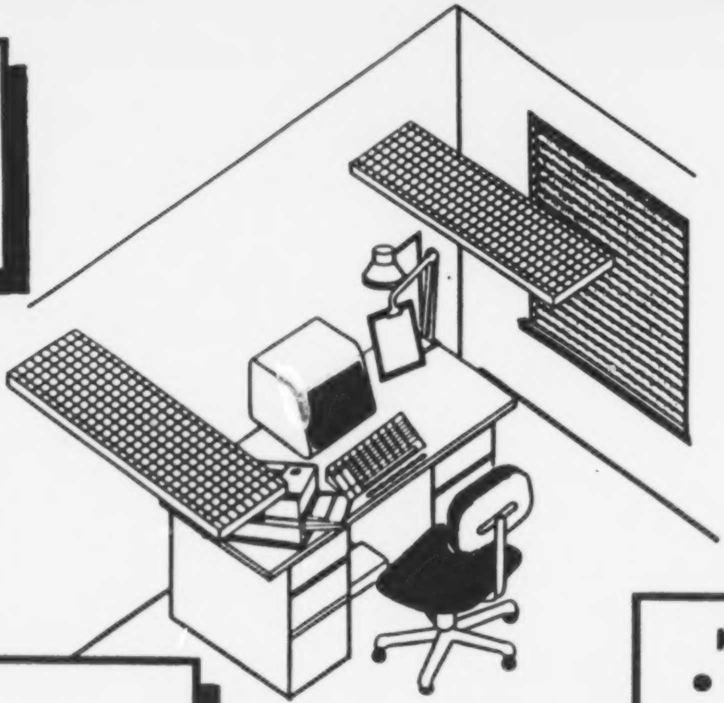
GENERAL ENVIRONMENT

- Walls and furnishings non-reflective
- Vents with airflow diverted from VDT
- Temperature 68-74 degrees F.
- Humidity 30-50%

WINDOW LIGHTING (if present)

- VDT screen at right angle
- Blinds, shades or curtains to control light

FIGURE 1



LIGHTING

- Recessed, indirect, or diffused
- Dimmed lighting where VDTs are used
- Task light

FLOORS AND CEILINGS

- Non-reflective
- Sound absorbing
- Antistatic carpets/mats

PRINTER

- Acoustic pads under printer
- Acoustic hoods and/or absorbent partitioning to reduce noise

MISCELLANEOUS

- Footrest
- Wristrest
- Document holder
- Detachable keyboard

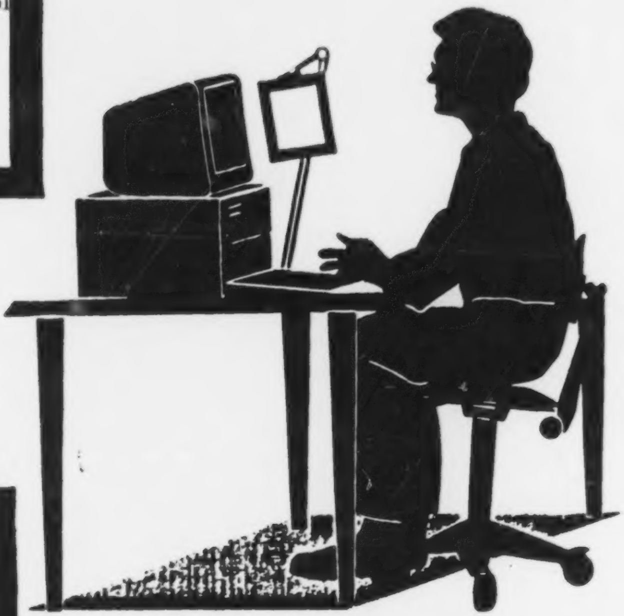
VIDEO DISPLAY TERMINAL (VDT)

- Display screen tilts
- Characters clear
- Positioned to avoid glare
- Glare screen available
- Adjust brightness and contrast control
- No flickers
- Proper gaze angle
- Operator 20" from screen

WORKSTATION/DESK

- Appropriate height for operator
- Adjustable
- 2' on one or both sides
- Adequate space for leg movement

FIGURE 2



CHAIR

- 5 legged base with casters
- Seat pan wide enough and slightly rounded
- Upholstered
- Fully adjustable
- Back rest for lumbar support

BEST COPY AVAILABLE

COMPUTER STRETCHES AND EXERCISES

Most of the following exercises, developed by exercise physiologists, may be done from a seated position at your computer terminal, in a *stable* chair. Each exercise and its benefit is briefly described. Most are designed to be held for five seconds, released and then repeated five to six times. When doing these exercises, the intent is to *stretch* your muscles, never to strain them to the point of discomfort or injury. If you have *any* pre-existing health problems, you may want to consult your doctor before incorporating these exercises into your work routine.

WARM-UP EXERCISES

Shake: Loosen up by moving your body parts. This promotes good blood circulation throughout your body.

Deep Breathing: Inhale deeply through your nose and exhale forcefully out your mouth. This aids in relaxing and reducing tension.

Tensing the Muscles: Tense your muscles and then slowly release them. This allows you to feel the difference internally between tension and relaxation.

OVERALL POSTURAL STRETCHES

Upper Body Stretch: Clasp both your hands behind your back, keeping your elbows straight while raising your arms up as high as you can. This releases tension in your back and improves posture.

Pectoral Stretch: Grasp your hands behind your neck and press your elbows back as far as you can. This is a good stretch to do when you find yourself slouching.

Reach: Raise your arms over your head and reach up as high as you can, stretching your rib cage and holding your stomach in. This stretches your rib cage and helps posture.

Total-Body Stretch: Stand with your feet together, clasping your hands in front of you at chest height; tuck your buttocks, curving your back so it forms a "C" as you pull your arms straight out in front of you; keep your head down; your ears should be level with your arms. For this exercise--hold for twenty seconds and repeat three times every two hours. This will give your body an energy boost.

VISUAL EXERCISES

Things To Remember:

- o Blink frequently -- at least once every three to five seconds.
- o Look up periodically.
- o Decrease glare and flicker as much as possible.
- o Adjust the brightness and contrast control on your VDT.
- o Wear proper computer eyewear for YOUR needs. Ask your eye doctor.
- o Vary your routine.
- o Take proper rest breaks away from the terminal.

**Remember that it takes approximately 16 minutes for your visual acuity to return to normal after two or more hours of continuous use on a VDT.

Focal Readjuster: Hold a pencil or pen eighteen inches from your eyes; look at the words on it until they become clearly focused and everything in the background is out of focus; then look above the pencil or pen into the background until it becomes clearly focused while the pencil or pen will now be out of focus. A finger can be substituted for a pencil or pen -- focus on a crease or scar. Repeat several times. This will reduce blurring and helps to exercise and to maintain flexibility of your lens and eye muscles.

Eye Rolls: Turn your eyes to the right without moving your head, then slowly turn them to the left in the same manner. Turn your eyes upward and then slowly downward. A variation of this can be done by moving your eyes in a diamond pattern -- to the right, up, to the left and downward. Repeat several times. This will reduce eye strain and fatigue by exercising the muscles that turn your eyeball.

NECK AND SHOULDER TENSION RELEASERS

Neck Relaxer: Drop your head slowly to the left, then to the right; slowly drop your chin to your chest and then repeat this entire sequence. This stimulates your neck muscles to alleviate a stiff neck.

Shoulder Stretch: Bring your right hand to your upper back from above while bringing your left hand to your upper back from below, trying to hook fingers of your two hands. Repeat to the other side. This reduces tension and increases flexibility.

Shoulder Roll: Slowly roll your shoulders backward five times in a circular motion using your full range of movement; then roll your shoulders forward. This releases nervous tension build-up in your neck and shoulders.

Elbow Circles: Place your hands on your shoulders, trying to cross your elbows in front of you until you feel the stretch across your upper back; bring your elbows down and then back in a circular motion until you have returned to starting position. Repeat three circles. This reduces muscle stiffness in your shoulders and upper back.

Middle-Upper Back Stretch: Hold your right arm just above the elbow with your left hand and gently pull your elbow toward your left shoulder as you feel the stretch. Do this on both sides. This stretches and relieves tension between your shoulder blades.

ARM, WRIST AND HAND EXERCISES

Squeeze and Tone: Hold a tennis ball in your hand, squeeze the ball as hard as you can and slowly release. Repeat with the opposite hand. This can also be done without a ball by simply making a fist. This tones your biceps and forearms.

Arm Press: Grasp your hands together in front of your chest with elbows out to the side; with a tennis ball in your palms, push your hands together as hard as you can, squeezing the ball. This can also be done without the ball. This strengthens your arms and chest.

Wrist Flex: Extend your arms directly in front of your body; with one hand hyperextend your wrist to bend the other hand, so that the back of your hand is aiming to the top of your forearm. Repeat with the opposite hand. This releases tension in your forearm, wrist and hand.

Finger Stretch: With finger tips together, spread your thumb and fingers as far apart as you can. This releases the tension build-up in your hands and fingers.

Finger Extension: Separate and straighten your fingers until tension of the stretch is felt; close fingers into a fist and release. This also releases the tension build-up in your hands and fingers.

BACK EXERCISES

Back Relaxer: While seated, drop your neck, shoulders and arms and then bend down between your knees as far as you can; return to an upright position, straighten out and relax. This takes pressure off your lower back.

Spine Stretch: Lean forward in your chair, feet slightly apart, with arms stretched out in front of you; elongate the spine. This prevents pressure on your vertebrae.

Side Stretch: With your fingers interlaced, lift your arms up over your head, keeping your elbows straight and pressing your arms backwards as far as you can; lean slowly first to the left and then to the right until you can feel the stretch along the sides of your body. This stretches the muscles along the side of your body from your arms to your hips.

Knee Kiss: While seated, pull one leg to your chest, grasping with both hands. Repeat with the opposite leg. This is a good stretch for your hamstrings and relieves lower back pain.

LEG, ANKLE AND FOOT EXERCISES

Leg Raise: Sitting upright, raise the right leg until it is straight out in front of the body, hold and slowly lower. Repeat with the opposite leg. This strengthens your quadriceps and abdominal muscles and increases circulation.

Ankle Flex: Extend your leg directly in front of your body, first pointing your toes out and then flexing your ankle so that your toes are pointing up; point and flex ten times. Repeat with the opposite leg. This strengthens and tones your calves and increases flexibility.

Ankle Circles: With toes pointed, extend your leg directly in front of your body and make clockwise circles with your foot; then make counterclockwise circles. Repeat with the opposite leg. This strengthens your ankles.

Exercises compiled by Ruth Krug and Fran Wilkinson.

UT AUSTIN GENERAL LIBRARIES

Ergonomics Task Force

About The Ergonomics Task Force

This page is an attempt to gather and make available to staff some of the more useful sources of ergonomics information that are available on the Internet. It is intended to supplement other documentation or programs that the task force may produce or make available. None of the information in any of the documents this page points to should be taken as medical advice. If you are experiencing symptoms of a cumulative trauma disorder you should consult your doctor.

Ergonomics Programs at Other Universities

- University of Virginia

Helpful Tips on Workstation Setup, Posture, Prevention and Exercise

- Workstation Ergonomics Guidelines prepared by the General Libraries Ergonomics Task Force.
- Diagram of proper workstation setup NEW From *Ergonomics and VDT Use*, Library of Congress Collections Services VDT Ergonomics Committee. Adapted from *The ABCs of VDTs: an AFSCME Safety and Health Guide*.
- Caring For Your Wrists Adam & Tonya Engst, TidBITs editors. This document contains advice on relieving stress, proper workstation ergonomics and exercises. The complete PostScript version of this document, with illustrations, is available for downloading from the Typing-injury arhive at UC Berkeley (see link below).
- Computer Related Repetitive Strain Injury Paul Marxhausen, University of Nebraska-Lincoln. This document contains good images of how to/not to hold your hands when typing, still pictures and videos of exercises to do, advice on taking breaks and software to help relieve the load on your hands.
- RSI and Adverse Mechanical Tension NEW Written by a sufferer in the UK, this is an article that discusses the difference between Carpal Tunnel Syndrome, Repetitive Strain Injury and Adverse Mechanical Tension. Contains advice on treatments you can practice on yourself, at home or work. Get a diagnosis from your doctor before you try this.

  Muscle Pains NEW A brief message from a US physician about Adverse Mechanical Tension.

  Biofeedback NEW This is a collection of postings to a newsgroup about the benefits of biofeedback, Tai Chi and yoga in learning to move in relaxed and natural ways.

Software to make you take breaks from your workstation - Macintosh

- Coffee Break 2.1.2 NEW (requires System 7 or above, 110K) Coffee Break is a simple application that is designed to force you to take periodic breaks, so that you can reduce your chances of getting a Repetitive Strain Injury. You may set an amount of "work time", during which Coffee Break sits in the background with a timer displayed, and an amount of "break time", or "sleep time", during which you are forced to take a break from the computer. Shareware price is $5.00.
- Help engine for Coffee Break online help NEW Free.

Other Online Resources for Ergonomics Information

- Typing Injury FAQ: General Information Dan S. Wallach, 1995. This is THE place to start when looking for online information. Dan's page has links to most of the other resources listed on this page.
- TechTime articles on RSI Injuries NEW Bill Peay, 1995. These articles were written by a sports massage therapist who worked with the 1984 Olympic rowing teams, and include a description of a self-massage technique to alleviate symptoms of tendonitis.
- Repetitive Strain Injuries Rob Hutten, Acadia University, Nova Scotia.

- CTDNews NEW A monthly print newsletter from the Center for WorkPlace Health on cumulative trauma disorders. Includes safety products, statistics, description of ctd symptoms and exercises, and the draft OSHA ergonomics standard.
- Typing Injury/Keyboard Alternative Archive at UC Berkeley Dan Kegel.
- A Patient's Guide to Carpal Tunnel Syndrome NEW Medical Multimedia Group. Excellent images of the anatomy of the carpal tunnel.
- Disability-Related Resources St. John's University,.

RSI Newsletter

- RSI Newsletter Issues
- RSI Newsletter Topics Index, Issues 1-16 June 1991 - February 1994

Some Articles on Ergonomics Issues

- Guidelines for Designing Effective and Healthy Learning Environments for Interactive Technologies Michael Weisberg, National Library of Medicine.
- Computers and Health. University Computing Services Publications, Indiana University, Bloomington, Indiana.
- Health and Computers MIT TechInfo, Massachusetts Institute of Technology.
- Citations from Library Literature search
- Ergonomics: Adapting your job to you Techtalk, Vol. 13., No. 17, February 3, 1994
- The Ergonomic Workplace Joanna Russell, UT Austin Computation Center, November 1991
- Articles on the Feldenkrais Method

The General Libraries | *UT Austin Central Server* |

Last updated July 20, 1995

If you have comments or suggestions about this page, send e-mail to $llergon@utxdp.dp.utexas.edu.

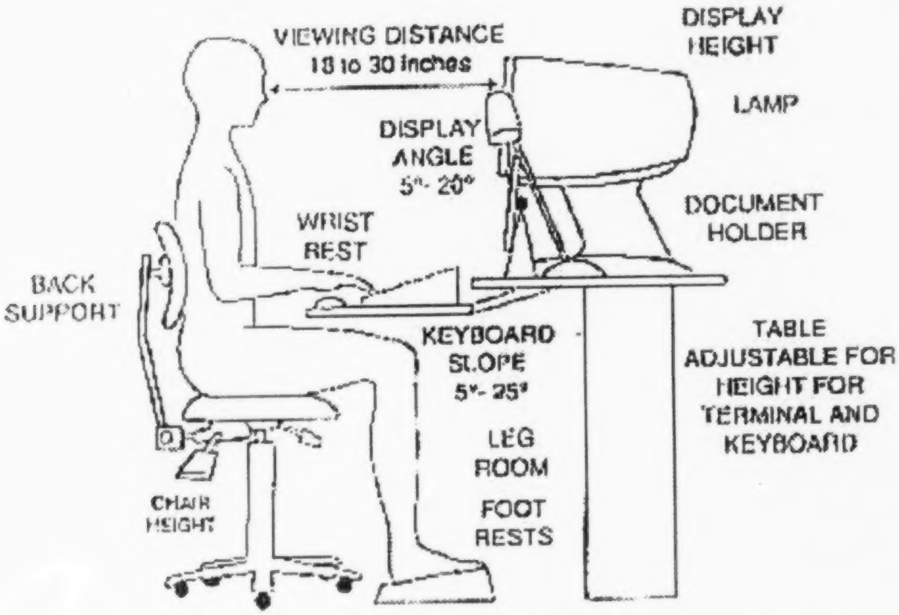
Ergonomics Guidelines

Workstation Health Information for General Libraries Staff

This home page offers guidelines and recommendations for workstation health and safety, compiled and evaluated by the Task Force on Ergonomics.

Contents

1. Introduction
2. Specific Recommendations
    - Chairs
    - Tables and Work Surfaces
    - Computer Hardware
        - Monitors
        - Keyboards
        - Mice
        - Alternative Input Devices
    - Environmental Factors
    - Human Factors
3. Further Reading



VIEWING DISTANCE
18 to 30 inches
DISPLAY HEIGHT
LAMP
DISPLAY ANGLE 5°- 20°
WRIST REST
DOCUMENT HOLDER
BACK SUPPORT
KEYBOARD SLOPE 5°- 25°
TABLE ADJUSTABLE FOR HEIGHT FOR TERMINAL AND KEYBOARD
LEG ROOM
CHAIR HEIGHT
FOOT RESTS

Diagram from "Ergonomics and VDT Use," flyer prepared by the Library of Congress Collections Services VDT Ergonomics Committee, 1991-92.

Introduction

These guidelines have been prepared to provide staff of the General Libraries with a broad basic knowledge of ergonomics. These guidelines should be used when preparing work areas, when purchasing workstation equipment and furniture, and when each staff member sits down at a workstation.

The institution, line managers, and each individual share responsibility for creating a safe workplace, but the individual worker is the most important actor to ensure safety. All of the training and materials in the world will be worthless unless people use them in their work.

There are some physical measurements in the guidelines below. Following them will likely improve the ergonomics of workstations and should help defend against repetitive stress injuries, but they should not be followed slavishly. For example, height of the chair seat and workstation tabletop may work fine within the acceptable range, but the key guideline is to keep the correct 90 degree angle between back and upper legs, between upper and lower legs, and between upper and lower arm, while at the same time keeping the head up and the feet flat on a support surface. If the "right" measurements do this, all well and good, but if you are not the right size for these measurements to be effective, arrange yourself and your workstation to keep your body positioned correctly regardless of the measurements.

Making the workstation ergonomically safe is most difficult for workstations shared by two or more workers. No two workers are shaped exactly the same. The key is to build in as much flexibility as possible so that each worker can make adjustments when first sitting at the workstation. Avoid the temptation to leave the workstation as the last person left it because it is too much trouble to change the settings. Your long range health depends on making proper adjustments.

If you experience pain which you believe is caused by factors at work, be sure to see your doctor. Living with the pain in the hope that it will go away may result in more serious injury that is harder to treat and slower to heal.

Specific Recommendations

Chairs

Legs

Chair should have 5 legs for stability and appropriate casters for easy movement while seated.

Height

Seat height should be pneumatically adjustable while seated. A range of 15-21 inches off the floor should accommodate most users. Thighs should be horizontal, lower legs vertical, feet flat on the floor or on footrest. Seat height should also allow a 90 degree angle at the elbows for typing.

Seat.

A seat width of 17-20 inches suffices for most people and should be deep enough to permit the back to contact the lumbar backrest without cutting into the backs of knees. The front edge should be rounded and padded. The seat slant should be adjustable (0 to 10 degrees). Avoid bucket-type seats. The seat should swivel easily.

Backrest.

The backrest should offer firm support, especially in the lumbar (lower back) region, should be 12-19 inches wide, and should be easily adjustable both in angle and height, while sitting. The optimum angle between seat and back should permit a working posture of at least 90 degrees between the spine and thighs. Seat pan angle and backrest height and angle should be coordinated to allow for the most comfortable weight load on the spinal column.

Padding.

A chair seat and back should be padded enough to allow comfortable circulation. If a seat is too soft, the muscles must always adjust to maintain a steady posture, causing strain and fatigue. The seat fabric should "breathe" to allow air circulation through clothes to the skin.

Armrests.

Armrests are optional, depending on user preference and tasks performed. They should not restrict movement or impede the worker's ability to get close enough to the work surface. The typist should not rest his or her forearms on armrests while typing.

Tables and Work Surfaces

Copy Stand.

Use of a copy holder-instead of resting copy on the table top-helps eliminate strain and discomfort by keeping the copy close to the monitor and at the same height and distance from the user's face as the screen.

Bi-Level.

User comfort (and strain avoidance) dictate that the keyboard should be at a lower level than the screen so that the screen can be viewed comfortably and the keyboard used comfortably. The familiar arrangement of stacking the monitor on the computer while keeping the keyboard on the table top can be successful. Another possibility is to use a special lower shelf for the keyboard. This may be especially useful when the table top is also needed as a writing surface-writing height for an individual is usually higher than that person's keyboard height.

Height.

Correct table height depends upon the user of a workstation and upon the chair and other factors that interact with the user and table. The ideal is for the user to be able to sit at the table with the keyboard in place and be able to easily maintain a 90=9A elbow angle and straight wrists while typing. The height of an adjustable keyboard support should adjust between 23" and 28" to accommodate most-but not all-users. 26" is a recommended compromise position, while leg clearance must still be considered.

Surface Area.

The table top should be big enough to allow space not only for all computer-related necessary equipment, but also for paperwork, books, and other materials needed while working at the computer. Working with materials on chairs and at odd angles has the potential for neck and other body strain. Frequently used items should be kept close to avoid long reaches. A general recommendation is that the table top should be at least as big as the standard office desk -- 30" by 60". A depth of at least 30" allows flexibility in use/reuse of the table. Usable space may be maximized by good wire/cable management.

Leg Room.

Knee spaces should allow a worker to feel uncrowded and to allow some changes of position -- even with the keyboard support lowered to the correct level for use. The knee space should be at least 30" wide by 19" deep by 27" high to comply with the requirements of the Americans with Disabilities Act. Leg clearance should be greater than the height of the thigh and knee of the largest person using the workstation; for those using a footrest, clearance must be calculated with the legs in place on the footrest. Likewise, depth of the "clearance envelope" for both knees and toes should be evaluated while the workstation user is in a normal working position at the table (determined by the design of the seating system and the way the user sits). Drawers and support legs (for furniture) should not go where human legs need to fit.

Minimum Knee Space Dimensions (in inches)

Minimum Knee Space	5th Percentile Female	95th Percentile Male
Minimum Depth*		
- Depth at knee level*	12.2 in.	15 in.
- Depth at toe level*	18.7 in.	23.5 in.
Minimum Width	20 in.	20 in.
Minimum Height**	20.2 in.	26.2 in.

*The minimum depth under the work surface from the user's edge of the work surface.

**From the floor to the bottom of a support surface.

(Source: ANSI/HFS 100-1988. Human Factors Engineering of Visual Display Terminal Workstations.)

Footrests.

Situations will arise in which a user is perfectly adjusted for keyboard use and with the monitor at a correct angle, but her/his feet do not rest flat on the floor. A footrest may be used to correct this problem.

Edges.

Table edges should be smoothed or rounded to avoid discomfort on the part of the user as hands, arms, and wrists contact the table.

Construction.

Sturdily built tables help avoid irritating vibrations.

Surfaces.

Medium and light-colored surfaces may help avoid excessive contrast with printed materials. A non-shiny surface is recommended to help in reducing glare.

Computer Hardware

Monitors

Selection

- "Refresh rate" refers to how often a screen image is "redrawn." Too slow a refresh rate produces noticeable screen flicker, contributing to eyestrain. The minimum refresh rate for the selected monitor should be 70 MHz.
- The monitor should be of the non-interlaced type.
- The monitor should be of a tilt-swivel type, to enable the user to adjust its positioning for optimum ergonomic benefit, i.e., to minimize neck twisting and craning.
- Monitor screens should be as flat as possible, to minimize potential focus problems.
- The selected monitor must comply with MPRII guidelines (guidelines of the Swedish National Board of Testing).
- When selecting an LCD (liquid crystal diode) monitor or screen, the active matrix type offers the clearest image for minimizing eyestrain.

Use

- Optimum monitor distance from the eyes is between 18 and 24 inches. Closer distance magnifies possible eyestrain, and dust and radiation exposure.
- The top of the screen should be at eye level, or not more than 15 degrees below eye level. If lower than this, the monitor should be raised by means of a monitor stand or other stable lift.
- If the monitor offers a manual focus adjustment, use it frequently to ensure the image is as sharp as possible.
- The electrical charges in monitors attract much dust. Clean the screen frequently to keep the image sharp.
- Eliminate or reduce screen glare by keeping direct light sources away from the screen. Use indirect lighting if possible. Don't position the monitor in front of a brighter light source.
- If glare can be reduced only through the use of an optional anti-glare attachment, make sure it has an AOA (American Optometric Association) Seal of Acceptance.
- A monitor that utilizes dark letters on a light background, or that offers this setup option, is preferable to reduce eyestrain. In building your monitor's "desktop" or creating a document, avoid using red or blue for either the background-where they tend to be brighter than the work document-or for the regular font (text) color-where they are less distinct.

Safety

- Monitors not only attract dust but repel it toward the face. Keeping the screen free of dust also minimizes potential allergic reactions.
- Monitors are a source of radiation. While some dangers thought to exist have been found to be minimal, others are still being studied. Radiation is most prevalent out the backs and sides of monitors. Workstations backing upon one another should be at least 48 inches apart. Workstations placed side-by-side should be at least 36 inches apart.
- For optimum radiation safety, turn off the monitor when not in use. On most newer workstations this can be done without shutting down the computer.

Keyboards

Height.

The keyboard should be placed at approximately seated elbow height. A worker's fingers should fall on the "home" row of keys while the arms fall straight down from the shoulders and the forearms are held parallel to the floor.

Wrists.

Wrists should be held in a neutral position, in line with the forearm, with no bend up, down, or to either side, while typing. When your arms are dangling straight down from the shoulders and relaxed, the wrists are in their natural position. This position should be duplicated as closely as possible while using the keyboard. Studies show that cumulative trauma disorders associated with computer use can be attributed to repetitive movements made while the wrist is bent up, down or sideways from a neutral position. This causes pressure to be exerted on the tendons, nerves, and blood vessels passing through the carpal tunnel.

Arms.

Arms should rest at your sides, with forearms held at approximately a 90 degree angle from the upper arms. Elbows should be kept as close to the body as possible with the shoulders relaxed to reduce strain on the upper body.

Posture.

The head should be kept over the shoulders to reduce strain on the neck and improve blood flow to the upper body. The back should be upright, against the back of the chair, so the weight of the upper body is supported by the chair. The chair should support the natural inward curve of the spine in the lower back. A pillow or rolled towel can be used to provide extra lumbar support if needed.

Pressure.

Moderate to light pressure should be used when typing. Use of excessive force can play a major role in cumulative trauma disorders. Keyboards should be operable with a light touch.

Keyboard slope.

The surface angle of the keyboard should be adjustable so the keys can be reached easily with the wrists in a neutral position. Some keyboards can be placed flat or angled slightly upwards at the back. A new keyboard is on the market that incorporates a negative slope, down and away from the user, and is also advertised as encouraging a neutral wrist position.

Keys.

Keys should be slightly concave on top to conform to the shape of the fingers and to keep them from sliding off keys. Keys should be large enough and should be spaced comfortably.

Finish.

A matte finish in a neutral color is needed to keep glare to a minimum and reduce distraction.

Wrist rests.

Wrist rests should only be used to support the wrists in pauses between typing if this is comfortable for the individual. Placing the wrists on a wrist rest while typing can create a bend in the wrists and pressure on the carpal tunnel. Wrist rests should have rounded, not sharp, edges and should provide a firm but soft cushion.

Split keyboard.

Split keyboards with a raised middle may facilitate a more natural position for the wrists while typing. Many alternative keyboard designs are available, but most are expensive and not widely available. There is much difference of opinion about their effectiveness in preventing cumulative trauma disorders.

Mice

- Always maintain a neutral wrist position, keeping wrists straight and relaxed.
- If you find it useful, use a mouse wrist support.
- Never use force when clicking or dragging the mouse.
- Use the whole arm to move the mouse, rather than just the forearm, which will prevent strain on the hand and wrist muscles.
- The mouse should be in the "immediate reach zone", avoiding placing it too far away, too low, or extended from the keyboard.
- Setting the mouse on a platform, slightly above the keyboard, offers natural comfort and maximum hand-eye coordination.
- If possible, switch the mouse to your other hand occasionally to avoid too much stress on one shoulder and arm.

Alternative Input Devices

There are many alternative input devices available to help reduce keystrokes. Some of these devices may be preferable, but some (notably the trackball) may not be any better than the keyboard or mouse. Whether they are really any better depends on the person's size, personal preferences, state of technology, availability, space, etc.

- Tablets and pens designed primarily to manipulate on-screen graphic objects.
- Footpedals can be used to enter a programmed set of keystrokes.
- Trackball: a ball mounted directly into the keyboard or in its own case that is rolled to move the cursor. Visualize an upside-down mouse.
- Touchpad: finger-operated, pressure sensitive pad-such as Apple Computer's Unmouse-that moves the cursor corresponding to the direction the finger moves.
- Touchscreen: a screen that is touched directly to place the cursor or make a choice.
- Voice activated system (or speech recognition software) that responds to the user's voice.

Other options:

Whenever possible use macros, function keys, "Easy Keys," or other such single key strokes that represent multiple keystrokes to the computer to decrease the number of key strokes you must make. (See appropriate user documentation for more information.)

Environmental Factors

Air.

Keep as much fresh air inside as possible-at least two air exchanges per hour. Maintain plenty of air circulation (but not drafts) especially around printers and copiers, but don't direct airflow toward the face.

Dust.

The computer creates an electrostatic field that attracts negatively charged particles, creating a film of dirt and repelling positively charged particles toward the operator's face. Keep dust in the area to a minimum.

Temperature and Humidity.

Maintain a comfortable temperature, from 68-72 degrees F. Maintain the humidity level in the air to about 30-50% relative humidity, but exercise caution as some computer equipment (notably laser printers) cannot operate with higher humidity levels.

Lighting/Glare.

Keep bright lights out of your field of vision. Lights should not flicker. Monitors should be turned 90 degrees from light sources such as windows. Use shades or blinds to dampen outside light. Indirect lighting is preferable, but it should not overpower the brightness of the screen. In general, the luminance of the monitor and the surroundings should vary by no more than a factor of 3, though recent research seems to indicate that a wider variance may be acceptable under certain circumstances. Ambient lighting should be in the 200-500 lux range. Keep luminance in the room at a constant level (i.e., there should be no bright spots). Use task lighting only if necessary; keep it as low as possible to do the job, but no brighter than the screen; and, make sure it does not spill light into your eyes or produce glare on the screen. Tilt the screen as appropriate to avoid glare from overhead sources. Some experts recommend not wearing white clothes which can create more glare on the screen. No one anti-glare device is best for all situations, and some (such as nylon mesh screen covers) are usually counterproductive by making the screen too dark for the surrounding light levels. In general, glare increases with the luminance, size, angle of incidence, and proximity of the source of light to the line of sight.

Noise.

Music, conversations, and other office noise should be low enough so as not to be distracting. Use acoustic panels and ceilings to balance sound. Ambient noise levels should be below 55 decibels.

Radiation.

Modern monitors have much lower radiation levels than earlier models. Maintain space behind monitors where most radiation occurs. No one should be within four feet of the back of a workstation for an extended period (and partitions do not block extremely low frequency (ELF) radiation). Because laser printers and copiers contribute to higher radiation levels, they should be situated away from staff members whenever possible.

Room surfaces.

Use matte finishes and neutral tones. Avoid pure white or reflective surfaces and avoid gloss or semi-gloss paint. Floors should be carpeted or have a dull finish.

Space.

You should have enough space to adopt various comfortable positions. While privacy may be important, you should be able to easily shift your focus to a distant object. Keep the most frequently used items within easy reach.

Static electricity.

Decrease static in the area by using carpet sprays, increasing humidity levels, etc.

Human Factors

Once you have a workstation ergonomically suited to you (and remember to adjust your workstation as soon as you sit at it), there are additional steps that you can take to avoid repetitive stress and ensure the success of a healthy working environment.

Relaxation:

Maintain good, relaxed posture. Don't crook the telephone headset between your ear and neck. Keep wrists flat in a neutral position. Use as light a keystroke as possible.

Exercise.

Exercise is one of the key elements in the successful outcome of an ergonomics program. You should move around at least once an hour during intensive computer use. Stretch; use recommended stretching exercises. Shift positions frequently. Vary your work routines; try to mix non-computer work with computer work. Participate in a regular fitness program away from work.

Vision.

Remember to blink! A normal blink rate is once every five seconds. Give your eyes a rest before they tire; close them for a few seconds. Use eye moisturizing drops to help soothe strained or dry eyes. Choose a distant focal point and frequently refocus from the monitor to that object (about every 10 minutes). Get sufficient rest. Schedule an eye exam. Buy computer glasses if recommended. Computer glasses are especially helpful for wearers of bifocal, trifocal, and/or corrective lenses.

Further Reading

Besides the citations here, see also other citations from a literature search.

Allie, Paul F., "Ergonomics and the healthy office," Managing Office Technology, (February 1994), p. 31-32.

Betts, Mitch, "VDT vision problems may affect 10 million," Computerworld, (February 8 1993), p. 31.

Bolas, Mark T., "Human factors in the design of an immersive display: using three-dimensional viewing devices at work," IEEE Computer Graphics and Applications, (January 1994), p.55+.

Bone, Jan., "Terminal solutions for video madness: physical problems caused by working with video display terminals," Safety & Health, (March 1992), p.42+.

Branscum, Deborah, "Clear-eyed computing: office workers and eyestrain," Macworld, (April 1992), p.69+.

Branscum, Deborah, "Monitors and health: low-emission displays are now the norm." Macworld, (December 1994), p. 175-176.

"Caring for your wrists," TidBITS, 1993.

Chadbourne, Robert, "Ergonomics and the electronic workplace," Wilson Library Bulletin, (January 1995), p. 24-26.

Corcoran, Cate C., "Screen refresh gives users pause: Macintosh requires monitors with high refresh rates," MacWEEK, (July 4 1994), p. 1+.

Creating a Healthy Work Environment, Apple Computer, 1991.

Dana, Amy, "Glare and VDT," Interiors, (March 1992), p.81.

Dyer, Hilary, with Morris, Anne. Human Aspects of Library Automation. Brookfield, Vermont: Gower, 1990.

Ellis, Caron Schwartz, "Your job doesn't have to be a pain," Austin Business Journal, (November 14-20, 1994), p. A12-A14.

Epstein, Randi Hutter, "Computers and vision: simple measures can ease eyestrain." Safety & Health, (July 1994), p. 40+.

Ergonomic Standards, Regulations and Your Workplace, Haworth, 1994.

"Ergonomics and VDT use," Computers in Libraries, (May 1993), p. 52+.

Ergonomics and VDT Use. Prepared by the Library of Congress Collections Services VDT Ergonomics Committee. Issued 1991; reissued 1992.

Erlanger, Leon, "Monitors (The Best of 1994)" PC Magazine, (January 10 1995), p. 118.

"Eyes and computers: research on computer screen refresh rates and eye strain," New York Times, (October 5 1993), p. C5.

Furger, Roberta, "Not for your eyes only," PC World, (February 1993), p.= 34.

Greeley, John, "Reduce injuries and improve productivity," Austin Business Journal, (November 14-20, 1994), p. A7+ .

Hilton, Don, "Alternative input devices take a load off wrists," Managing Office Technology, (August 1994), p. 32+ .

Leavitt, Stewart B., "Women's health at risk in the office," Managing Office Technology, (November 1994), p. 27-30.

Levy, Michael, "How to pick your perfect chair," Managing Office Technology, (January 1995), p. 43-44.

Manning, Patrick G., "Five ways to kill your ergonomic program," Managing Office Technology, (January 1995), p. 46.

McGinnis, Bill, "Of monitors and emissions," BYTE, (September 1990), p. 44-5+.

O'Connor, Rory J., "Seeking ELF relief," Macworld, (October 1991), p. 124+

Pagano, Joseph., "Today's screen technology is not in step with the GUI paradigm." InfoWorld, (June 20 1994), p. 60.

"Plight of the modern mouse," Managing Office Technology, (March 1994), p. 49-50.

Sellers, Don, Zap!: How your computer can hurt you-and what you can do about it. Berkeley, CA: Peachpit Press, 1994.

Taylor, Mark and Christine Menapace, "The Seas of change," Today's

Facilities Manager, (January 1995), p. 1+ .

The Way We Work: A User's Guide to Office Ergonomics and Body Mechanics. 1991.

Go Back to Ergonomics Home Page

These guidelines were prepared by the General Libraries Task Force on Ergonomics.
Members: Larayne Dallas, David Flaxbart, Robin Fradenburgh, John Henley, Kerry McFarland, Alison O'Balle, Drew Racine (Chair)

Last updated 6/95.

The General Libraries
The University of Texas at Austin
Facilities and Support Services Division

ERGONOMICS TASK FORCE

CHARGE: Through 8/31/95 to serve as a staff resource on those aspects of ergonomics relating particularly to workstation design and use. To work with University agencies to make use of available resources and keep abreast of developments or initiatives in this area. Within resources available, to implement recommendations.

TASKS:

To tap University resources such as Physical Plant, the Office of Human Resources, the College of Engineering, the Department of Kinesiology and Health Education, the Student Health Center and other agencies as appropriate on an ongoing basis to take advantage of University initiatives and resources in the area of workstation ergonomics.

To investigate furniture, equipment, lighting, and various aids available to improve workstation ergonomics for the physical comfort and well-being of library staff; to recommend guidelines for setting up new workstations and upgrading existing workstations.

Within University resources, to arrange for assistance in evaluating individual workstations for staff experiencing difficulties in workstation use.

To provide training opportunities for staff, especially measures staff can take to help themselves avoid repetitive motion injuries and/or other injuries resulting from their use of workstations. To provide written information for employees on workstation comfort and health measure for preventing repetitive stress injuries.

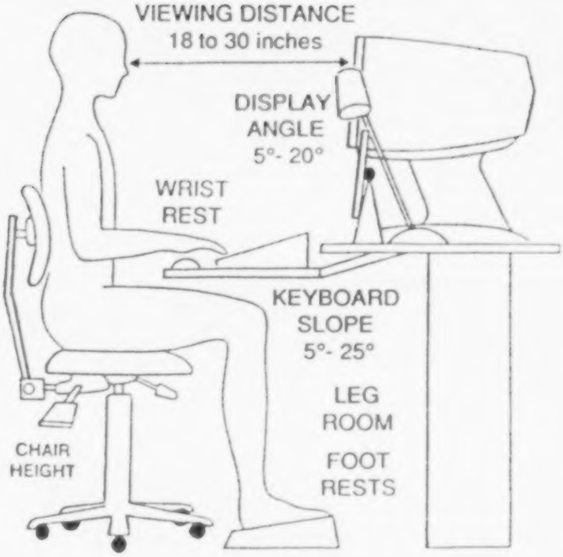
Task Force reports to Mary Seng, Assistant Director for Facilities and Support Services.

MEMBERSHIP:

Drew Racine, Chairman	General Libraries Office
Larayne Dallas	Engineering Library
David Flaxbart	Chemistry Library
Alison O'Balle	Library Systems
Robin Fradenburgh	Automated Cataloging
John Henley	Facilities and Support Services
Carol Sisson	General Libraries Office

AT YOUR WORKSTATION

- Adjust your **chair** and work area correctly - make yourself comfortable
- Watch your **posture** - sit up straight!
- **Wrists** should be in neutral
- **Relax** - don't pound on the keys!
- Take **micro-breaks** - stretch & breathe
- Rest your **eyes** - blink and refocus
- Break up keyboard work with **other tasks** - use the phone, go to the copier, file
- Consider using **keyboard shortcuts** for mouse operations
- If you have pain, tingling, or numbness see your doctor!

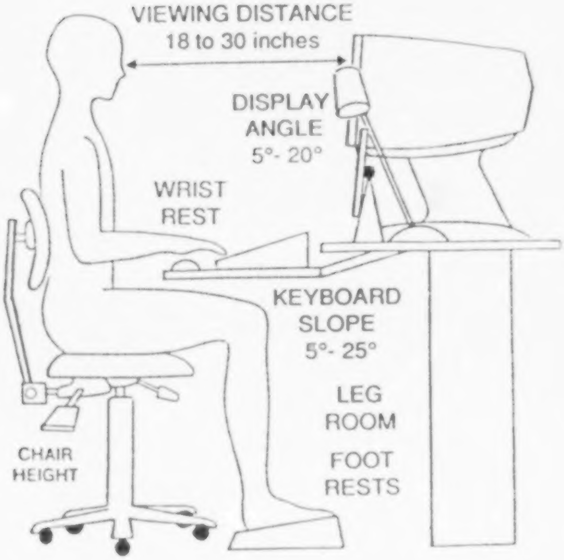

VIEWING DISTANCE
18 to 30 inches
DISPLAY ANGLE
5°- 20°
WRIST REST
KEYBOARD SLOPE
5°- 25°
LEG ROOM
FOOT RESTS
CHAIR HEIGHT

FOR LIFE

Take care of your body. Exercise regularly, get a good night's sleep, follow a good diet and drink plenty of water.

AT YOUR WORKSTATION

- Adjust your **chair** and work area correctly - make yourself comfortable
- Watch your **posture** - sit up straight!
- **Wrists** should be in neutral
- **Relax** - don't pound on the keys!
- Take **micro-breaks** - stretch & breathe
- Rest your **eyes** - blink and refocus
- Break up keyboard work with **other tasks** - use the phone, go to the copier, file
- Consider using **keyboard shortcuts** for mouse operations
- If you have pain, tingling, or numbness see your doctor!


VIEWING DISTANCE
18 to 30 inches
DISPLAY ANGLE
5°- 20°
WRIST REST
KEYBOARD SLOPE
5°- 25°
LEG ROOM
FOOT RESTS
CHAIR HEIGHT

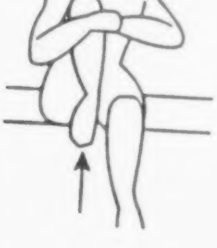
FOR LIFE

Take care of your body. Exercise regularly, get a good night's sleep, follow a good diet and drink plenty of water.

EXERCISE PACKET

UNIVERSITY OF WASHINGTON LIBRARIES

STAFF DEVELOPMENT & TRAINING



Anderson, Bob Stretching

Who Should Stretch

Everyone can learn to stretch, regardless of age or flexibility. You do not need to be in top physical condition or have specific athletic skills. Whether you sit at a desk all day, dig ditches, do housework, stand at an assembly line, drive a truck, or exercise regularly, the same techniques of stretching apply. The methods are gentle and easy, conforming to individual differences in muscle tension and flexibility. So, if you are healthy, without any specific physical problems, you can learn how to stretch safely and enjoyably.

Note.

Note: *If you have had any recent physical problems or surgery, particularly of the joints and muscles, or if you have been inactive or sedentary for some time, please consult your physician before you start a stretching or exercise program.*

When To Stretch

Stretching can be done any time you feel like it: at work, in a car, waiting for a bus, walking down the road, under a nice shady tree after a hike, or at the beach. Stretch before and after physical activity, but also stretch at various times of the day when you can. Here are some examples:

In the morning before the start of the day.
At work to release nervous tension.
After sitting or standing for a long time.
When you feel stiff.
At odd times during the day, as for instance, when watching TV, listening to music, reading, or sitting and talking.

Why Stretch

Stretching, because it relaxes your mind and tunes up your body, should be part of your daily life. You will find that regular stretching will do the following things:

Reduce muscle tension and make the body feel more relaxed.
Help coordination by allowing for freer and easier movement.
Increase range of motion.
Prevent injuries such as muscle strains. (A strong, pre-stretched muscle resists stress better than a strong, unstretched muscle.)
Make strenuous activities like running, skiing, tennis, swimming, cycling easier because it prepares you for activity; it's a way of signaling the muscles that they are about to be used.
Develop body awareness. As you stretch various parts of the body, you focus on them and get in touch with them. You get to know yourself.
Help loosen the mind's control of the body so that the body moves for "its own sake" rather than for competition or ego.
Promote circulation.
It feels good. □

How To Stretch

Stretching is easy to learn. But there is a right way and a wrong way to stretch. The right way is a relaxed, sustained stretch with your attention focused on the muscles being stretched. The wrong way (unfortunately practiced by many people), is to bounce up and down, or to stretch to the point of pain: these methods can actually do more harm than good.

If you stretch correctly and regularly, you will find that every movement you make becomes easier. It will take time to loosen up tight muscles or muscle groups, but time is quickly forgotten when you start to feel good.

The Easy Stretch

When you begin a stretch, spend 10-30 seconds in the *easy stretch*. No bouncing! Go to the point where you feel a *mild tension*, and relax as you hold the stretch. The feeling of tension should subside as you hold the position. If it does not, ease off slightly and find a degree of tension that is comfortable. The easy stretch reduces muscular tightness and readies the tissues for the developmental stretch.

The Developmental Stretch

After the easy stretch, move slowly into the *developmental stretch*. Again, no bouncing. Move a fraction of an inch further until you again feel a mild tension and hold for 10-30 seconds. Be in control. Again, the tension should diminish; if not, ease off slightly. The developmental stretch fine-tunes the muscles and increases flexibility.

Breathing

Your breathing should be slow, rhythmical and under control. If you are bending forward to do a stretch, exhale as you bend forward and then breathe slowly as you hold the stretch. Do not hold your breath while stretching. If a stretch position inhibits your natural breathing pattern, then you are obviously not relaxed. Just ease up on the stretch so you can breathe naturally.

Excerpts from:

Stretching by Bob Anderson, Illustrated by Jean Anderson

Shelter Publications, Inc.
Bolinas, California, USA

BEST COPY AVAILABLE

AT THIS TIME LETS GO OVER SOME OF THE BASIC TECHNIQUES OF STRETCHING:

- Don't stretch too far, especially in the beginning. Get a slight stretch and increase it after you feel yourself relax.
- Hold a stretch in a comfortable position; the stretch tension should subside as you hold it.
- Breathe slowly, deeply and naturally--exhale as you bend forward. Do not stretch to a point where you cannot breathe normally.
- Do not bounce. Bouncing tightens the very muscles you are trying to stretch. Stretch and hold it.
- Think about the area being stretched. Feel the stretch. If the tension becomes greater as you stretch, you are over-stretching. Ease off into a more comforatble position.
- Do not try to be flexible. Just learn to stretch properly and flexibility will come with time. Flexibility is only one of the many by-products of stretching.

OTHER THINGS TO BE AWARE OF:

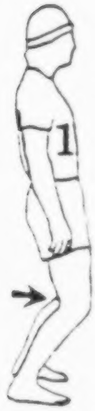
- We are different every day. Some days we are more tight or loose than other days.
- You have control over what you feel by what you do.
- Regularity and relaxation are the most important factors in stretching. If you start stretching regularly you will naturally become more active and fit.
- Don't compare yourself with others. Even if you are tight or inflexible, don't let this stop you from stretching and improving yourself.
- Proper stretching means stretching within your own limits, relaxed, and without comparisons.
- Stretch whenever you feel like it. It will always make you feel good.

Before & After

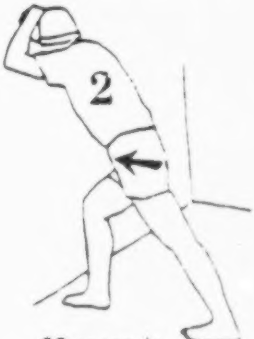
Indoor and Outdoor Work

Approximately 5 Minutes

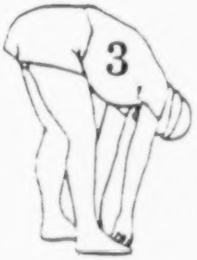
Before you do any indoor or outdoor work such as cleaning, painting, gardening, digging, building, carrying heavy loads, do a few minutes of easy stretching. This will help get your body ready to work efficiently without the usual muscle tightness and stiffness that results from this kind of work. Stretch to reduce muscle tension and make work easier.



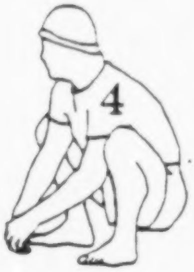
30 seconds



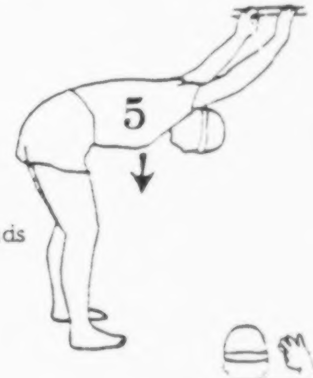
20 seconds
each leg



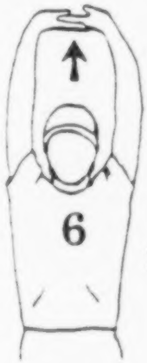
20 seconds



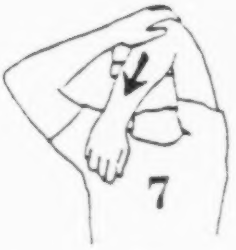
20 seconds



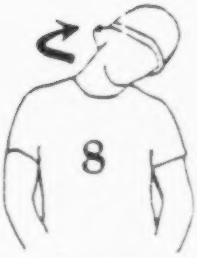
15 seconds



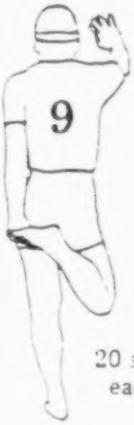
2 times
10 seconds each



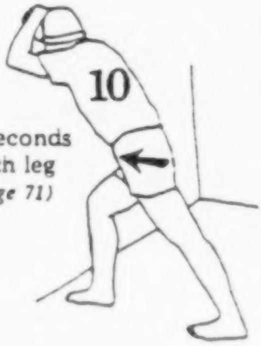
10 seconds
each arm



5 times
each direction



20 seconds
each leg

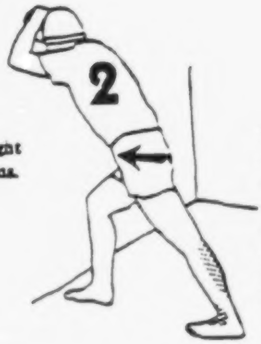


20 seconds
each leg
(page 71)

Important:
Any time you bend at the waist to stretch, remember to bend your knees slightly (1 inch or so). It takes the pressure off your lower back. Use the big muscles of the upper legs to stand up, instead of the small muscles of the lower back. Never bring yourself to an upright position with knees locked.

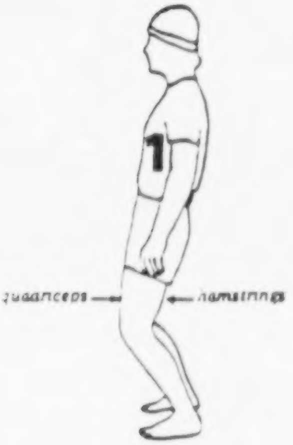
This is a particularly good stretch to do before any kind of heavy labor, especially in the morning or when weather is cold. By protecting the muscles in the lower back, many injuries will be prevented.

This principle is important in lifting heavy objects off the ground



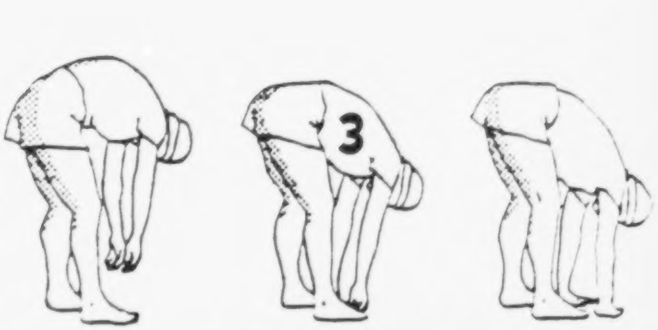
To stretch your calf, stand a little ways from a solid support and lean on it with your forearms, head resting on hands. Bend one leg and place your foot on the ground in front of you, with the other leg straight behind. Slowly move your hips forward, keeping your lower back flat. Be sure to keep the heel of the straight leg on the ground, with toes pointed straight ahead or slightly turned in as you hold the stretch. Hold an easy stretch for 30 seconds. Do not bounce. Stretch other leg.

Next, assume a bent-knee position with your heels flat, toes pointed straight ahead and feet about shoulder-width apart. Hold this position for 30 seconds.



In this bent-knee position you are tightening the quadriceps and relaxing the hamstrings. The primary function of the quadriceps is to straighten the leg. The basic function of the hamstrings is to bend the knee. Because these muscles have opposing actions, tightening the quadriceps will relax the hamstrings.

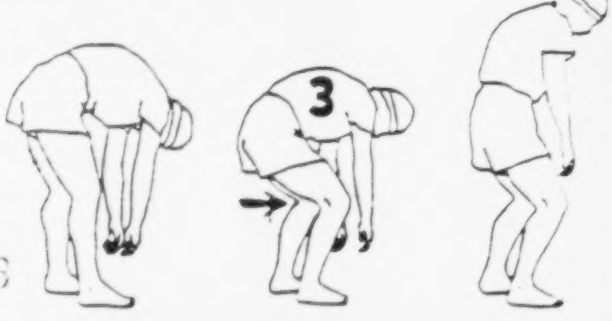
Now, as you hold this bent-knee position, feel the difference between the front of the thigh and the back of the thigh. The quadriceps should feel hard and tight while the hamstrings should feel soft and relaxed. It is easier to stretch the hamstrings if they have been relaxed first.



Start in a standing position with feet about shoulder-width apart and pointed straight ahead. Slowly bend forward from the hips. Always keep knees slightly bent during the stretch (1 inch) so lower back is not stressed. Let your neck and arms relax. Go to the point where you feel a slight stretch in the back of your legs. Stretch in this easy phase for 15-25 seconds, until you are relaxed. Let yourself relax physically by mentally concentrating on the area being stretched. Do not stretch with knees locked or bounce when you stretch. Simply hold an easy stretch. Stretch by how you feel and not by how far you can go.

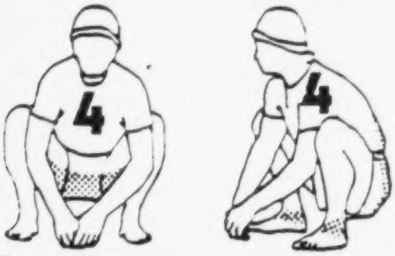
When you do this stretch you will feel it mostly in the hamstrings (back of thighs) and back of the knees. The back will also be stretched, but most of the stretch will be felt in the back of the legs.

Some of you will be able to touch your toes, or just above the ankles. Although we are different in flexibility, we do have one thing in common: we are all stretching our muscles.

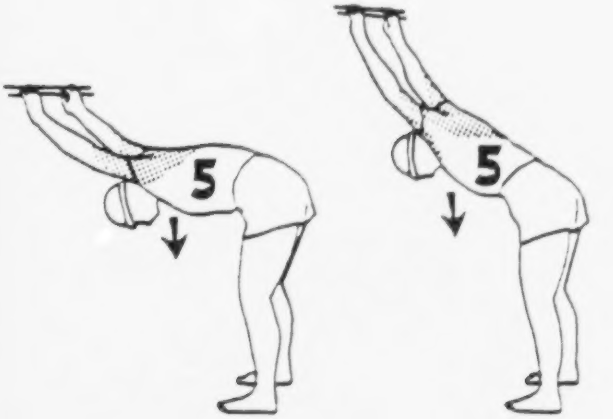


BEST COPY AVAILABLE

Many of us get tired in the lower back from hours of standing and sitting. One position which helps to reduce this tension is the squat.



From a standing position, squat down with your feet flat and toes pointed out at approximately 15° angles. Your heels should be 4-12 inches apart, depending on how limber you are, or as you become familiar with stretching, depending on exactly what parts of your body you want to stretch. The squat stretches the front part of the lower legs, the knees, back, ankles, Achilles tendons, and deep groin. Keep knees to the outside of your shoulders. Knees should be directly above big toes in this squat position. Hold comfortably for 30 seconds. For many people this will be easy, for others very difficult.

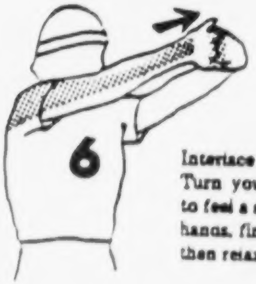


Another good upper body and back stretch is to place both hands shoulder-width apart on a fence or ledge and let your upper body drop down as you keep your knees slightly bent (1 inch). (Always bend your knees when coming out of this stretch.) Your hips should be directly above your feet.

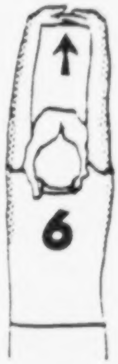
Now, bend your knees just a bit more and feel the stretch change. Place your hands at different heights and change the area of the stretch. After you become familiar with this stretch it is possible to really stretch the spine. Great to do if you have been slumping in the upper back and shoulders all day. This will take some of the kinks out of a tired upper back. Find a stretch that you can hold for at least 30 seconds.

The top of the refrigerator or a file cabinet are good to use for this stretch. Do it slowly. It can be done practically anywhere: all it takes is a little thought and some doing.

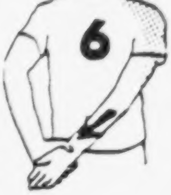
Work a little on it every day and get a good stretch. After a while you will be able to do this stretch without help. It reduces tension and increases flexibility. It also acts as an upper body revitalizer when you are tired.



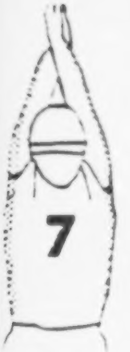
Interlace your fingers out in front of you at shoulder height. Turn your palms outward as you extend your arms forward to feel a stretch in your shoulders, middle of upper back, arms, hands, fingers, and wrists. Hold an easy stretch for 15 seconds, then relax and repeat.



Interlace your fingers above your head. Now, with your palms facing upward, push your arms slightly back and up. Feel the stretch in arms, shoulders, and upper back. Hold stretch for 15 seconds. Do not hold your breath. This stretch is good to do anywhere, anytime. Excellent for slumping shoulders.

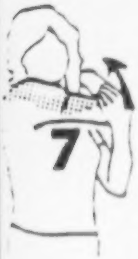


To stretch the side of your neck and top of shoulder, lean your head sideways toward your left shoulder as your left hand pulls your right arm down and across, behind your back. Hold an easy stretch for 10 seconds. Do both sides. This stretch can be done sitting on the floor, in a chair, or while standing.

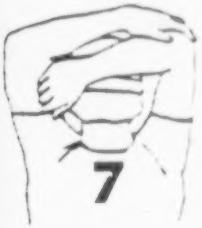


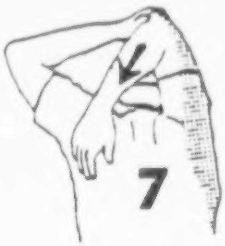
With arms extended overhead and palms together as drawing shows, stretch arms upward and slightly backwards. Breathe in as you stretch upward, holding the stretch for 5-8 seconds.

This is a great stretch for the muscles of the outer portions of the arms, shoulders, and ribs. It can be done any time and any place to relieve tension and create a feeling of relaxation and well-being.



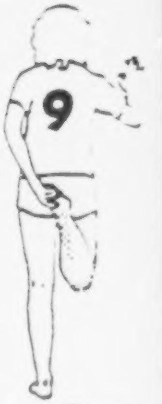
To stretch your shoulder and middle of upper back, gently pull your elbow across your chest toward your opposite shoulder. Hold stretch for 10 seconds.



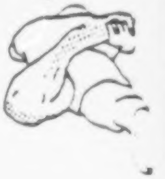


Here is a simple stretch for your triceps and the top of your shoulders. With arms overhead, hold the elbow of one arm with the hand of the other arm. Gently pull the elbow behind your head, creating a stretch. Do it slowly. Hold for 15 seconds. Do not use drastic force to limber up.

Stretch both sides. Does it feel like one side is a lot tighter than the other side? This is a good way to begin loosening up your arms and shoulders. You can do this stretch while walking.

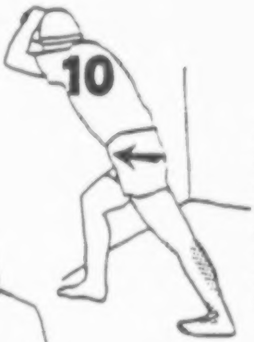


To stretch the quad and knee, hold the top of your *right* foot with your *left* hand and gently pull your heel toward your buttocks. The knee bends at a natural angle when you hold your foot with the opposite hand. This is good to use in knee rehabilitation and with problem knees. Hold for 30 seconds, each leg.

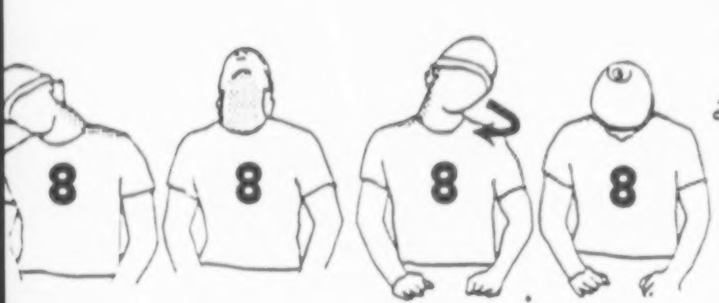


A variation of this stretch can be done lying on your stomach. Be sure to stretch without pain. Reach behind you with your hand and hold the top of your opposite foot between the ankle joint and toes. Gently pull your heel toward the middle of your buttocks. Hold 8-12 seconds.

Remember to stretch under control. Start in a place that is fairly easy and go from there. Improvement and results will occur faster if you go from an easy stretch to a developmental stretch. Let yourself limber up slowly. Remember, straining will keep you from fully realizing the many benefits of stretching.



To stretch your calf, stand a little ways from a solid support and lean on it with your forearms, head resting on hands. Bend one leg and place your foot on the ground in front of you, with the other leg straight behind. Slowly move your hips forward, keeping your lower back flat. Be sure to keep the heel of the straight leg on the ground, with toes pointed straight ahead or slightly turned in as you hold the stretch. Hold an easy stretch for 30 seconds. Do not bounce. Stretch other leg.



Sit in a position that is comfortable. *Very slowly* roll your head around in a full circle as you keep your back straight. While you are rolling your head around slowly you may feel that you should stop and hold a stretch at a particular place that feels tight. Do so, but don't strain. If you are holding a position, be relaxed and the area will gradually loosen up.

BEST COPY AVAILABLE

Staying Healthy on the Job: Ergonomic Exercises to Perform at the Computer

Ruth Krug and Frances C. Wilkinson

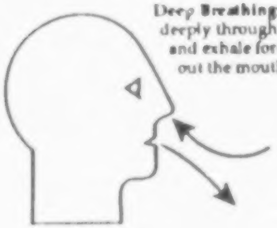
The University of New Mexico General Library - Albuquerque, New Mexico

Abstract

A new video display terminal (VDT) appears in the office every 13 seconds. Computerization of this magnitude has dramatically changed the workplace—libraries included! It has increased health concerns in regard to office automation, since a growing number of employees spend long hours working on VDTs. Ergonomic principles suggest that workers be given training in how to adjust computer workstations to fit themselves. Just as important in contributing to good worker health are proper posture and the regular use of simple exercises to help prevent visual and muscular fatigue. This presentation depicts exercises, developed by exercise physiologists, which are designed to be done in a matter of minutes at the terminal, with no special equipment, clothing, skills, or athletic ability required. Exercises described and illustrated are grouped into four types: warm-ups, overall posture, visual, and exercises for specific musculoskeletal groups.

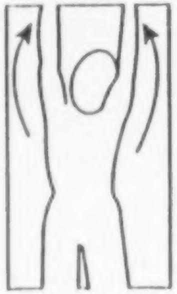
Warm-Ups

Deep Breathing: inhale deeply through the nose and exhale forcefully out the mouth



Overall Postural Stretches

Reach: raise your arms over your head and reach up as high as you can

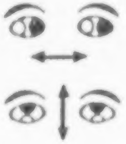


Visual Exercises

Things to remember

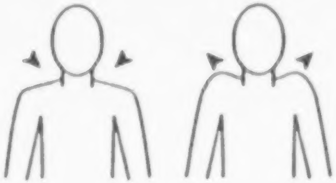
- Blink frequently
- Look up periodically
- Decrease glare and flicker as much as possible
- Adjust the brightness and contrast control
- Wear proper computer eyewear for YOUR needs
- Vary your work routine
- Take rest breaks away from the terminal

Eye Rolls: turn eyes to the right without moving head, then to the left, then up, and down



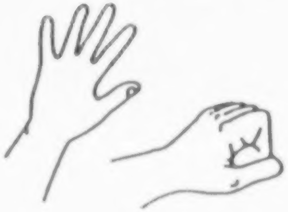
Neck and Shoulder Tension Releasers

Shoulder Roll: roll shoulders backward in a circular motion, then roll forward



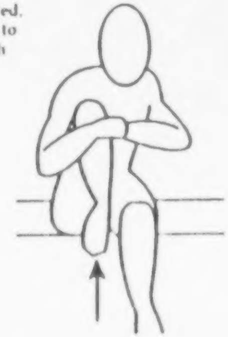
Arm, Wrist, and Hand Exercises

Finger Extension: splay fingers, then make a fist



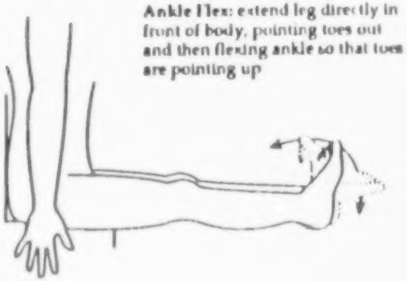
Back Exercises

Knee Kiss: while seated, bend and pull one leg to your chest; repeat with opposite leg



Leg, Ankle, and Foot Exercises

Ankle Flex: extend leg directly in front of body, pointing toes out and then flexing ankle so that toes are pointing up



American Library Association • Poster Session, June 1990

BEST COPY AVAILABLE

COMPUTER STRETCHES AND EXERCISES

compiled by Ruth Krug and Fran Wilkinson

Most of the following exercises, developed by exercise physiologists, may be done from a seated position at your computer terminal, in a stable chair. Each exercise and its benefit is briefly described. Most are designed to be held for five seconds, released and then repeated five to six times. When doing these exercises, the intent is to stretch your muscles, never to strain them to the point of discomfort or injury. If you have any pre-existing health problems, you may want to consult your doctor before incorporating these exercises into your work routine.

WARM-UP EXERCISES

Shake: loosen up by moving your body parts. This promotes good blood circulation throughout your body.

Deep Breathing: inhale deeply through the nose and exhale forcefully out the mouth. This aids in relaxing and reducing tension.

Tensing the Muscles: tense your muscles and then slowly release them. This allows you to feel the difference internally between tension and relaxation.

OVERALL POSTURAL STRETCHES

Upper Body Stretch: clasp both your hands behind your back, keeping your elbows straight while raising your arms up as high as you can. This releases tension in your back and improves posture.

Pectoral Stretch: grasp your hands behind your neck and press your elbows back as far as you can. This is a good stretch to do when you find yourself slouching.

Reach: raise your arms over your head and reach up as high as you can, stretching your rib cage and holding your stomach in. This stretches your rib cage and helps posture.

Total-Body Stretch: stand with your feet together, clasping your hands in front of you at chest height; tuck your buttocks, curving your back so it forms a "C" as you pull your arms straight out in front of you; keep your head down; your ears should be level with your arms. For this exercise--hold for twenty seconds and repeat three times every two hours. This will give your body an energy boost.

VISUAL EXERCISES

Things To Remember:

- o Blink frequently -- at least once every three to five seconds
- o Look up periodically
- o Decrease glare and flicker as much as possible
- o Adjust the brightness and contrast control on your VDT
- o Wear proper computer eyewear for YOUR needs. Ask your Eye Doctor
- o Vary your routine
- o Take proper rest breaks away from the terminal

**Remember that it takes approximately 16 minutes for your visual acuity to return to normal after two or more hours of continuous use on a VDT.

Focal Readjuster: hold a pencil or pen eighteen inches from your eyes; look at the words on it until they become clearly focused, everything in the background will be out of focus; then look above the pencil or pen into the background until it becomes clearly focused, the pencil or pen will be out of focus. A finger can be substituted for a pencil or pen -- focus on a crease or scar. Repeat several times. This will reduce blurring and helps exercise and maintain flexibility of the lens and eye muscles.

Eye Rolls: turn your eyes to the right without moving your head, then slowly turn them to the left in the same manner. Turn your eyes upward and then slowly downward. A variation of this can be done by moving your eyes in a diamond pattern -- to the right, up, to the left and downward. Repeat several times. This will reduce eye strain and fatigue by exercising the muscles that turn the eyeball.

NECK AND SHOULDER TENSION RELEASERS

Neck Relaxer: drop your head slowly to the left, then to the right; slowly drop your chin to your chest and then repeat this entire sequence. This stimulates the neck muscles to alleviate a stiff neck.

Shoulder Stretch: bring your right hand to your upper back form above while bringing your left hand to your upper back from below, trying to hook fingers of your two hands. Repeat to the other side. This reduces tension and increases flexibility.

Shoulder Roll: slowly roll your shoulders backward five times in a circular motion using your full range of movement; then roll your shoulders forward. This releases nervous tension build-up in the neck and shoulders.

Elbow Circles: place your hands on your shoulders, trying to cross your elbows in front of you until you feel the stretch across your upper back; bring your elbows down and then back in a circular motion until you have returned to starting position. Repeat three circles. This reduces muscle stiffness of the shoulders and upper back.

Middle-Upper Back Stretch: hold your right arm just above the elbow with your left hand and gently pull your elbow toward your left shoulder as you feel the stretch. Do this on both sides. This stretches and relieves tension between the shoulder blades.

ARM, WRIST AND HAND EXERCISES

Squeeze and Tone: hold a tennis ball in your hand, squeeze the ball as hard as you can and slowly release. Repeat with the opposite hand. This can also be done without a ball by simply making a fist. This tones the biceps and forearms.

Arm Press: grasp your hands together in front of your chest with elbows out to the side; with a tennis ball in your palms, push your hands together as hard as you can, squeezing the ball. This can also be done without the ball. This strengthens the arms and chest.

Wrist Flex: extend your arms directly in front of your body; with one hand hyperextend your wrist to bend the other hand, so that the back of your hand is aiming to the top of your forearm. Repeat with the opposite hand. This releases tension in your forearm, wrist and hand.

Finger Stretch: with finger tips together, spread your thumb and fingers as far apart as you can. This releases the tension build-up in your hands and fingers.

Finger Extension: separate and straighten your fingers until tension of the stretch is felt; close fingers into a fist and release. This also releases the tension build-up in your hands and fingers.

BACK EXERCISES

Back Relaxer: while seated, drop your neck, shoulders and arms, then bend down between your knees as far as you can; return to an upright position, straighten out and relax. This takes pressure off your lower back.

Spine Stretch: lean forward in your chair, feet slightly apart, with arms stretched out in front of you; elongate the spine. This prevents pressure on the vertebrae.

Side Stretch: with your fingers interlaced, lift your arms up over your head, keeping your elbows straight and pressing your arms backwards as far as you can; lean slowly first to the left and then to the right until you can feel the stretch along the sides of your body. This stretches the muscles along the side of your body from your arms to your hips.

Knee Kiss: while seated, pull one leg to your chest, grasping with both hands. Repeat with the opposite leg. This is a good stretch for the hamstrings and relieves lower back pain.

LEG, ANKLE AND FOOT EXERCISES

Leg Raise: sitting upright, raise the right leg until it is straight out in front of the body, hold and slowly lower. Repeat with the opposite leg. This strengthens the quadriceps and abdominal muscles and increases circulation.

Ankle Flex: extend your leg directly in front of your body, first pointing your toes out and then flexing your ankle so that your toes are pointing up; point and flex ten times. Repeat with the opposite leg. This strengthens and tones calves and increases flexibility.

Ankle Circles: with toes pointed, extend your leg directly in front of your body and make clockwise circles with your foot; then make counterclockwise circles. Repeat with the opposite leg. This strengthens the ankles.

***Many of these exercises have been taken from:

Austin, Denise. *Tone Up at the Terminals: An exercise guide for high-tech automated office workers*. Garrison, NY : Denise Austin Fitness Systems, Inc., 1988.

Donkin, Scott W. *Sitting on the Job: How to survive the stresses of sitting down at work - a practical handbook*. Boston : Houghton Mifflin Company, 1989.

There are three software programs available for computer stretches (musculoskeletal) and eye exercises:

Anderson, Bob and Jean. *Computer Stretches*, version 1. Denver : FB Systems, Inc., 1987.

Exerceyes, version 1.0. Burlingame, CA : Computereyesed Software Innovations, 1988.

It's Eye Time! On-Line Exercises for Computer Weary Eyes. Brentwood, NY : Caddylak Systems, Inc., 1988.

copyright, Krug/Wilkinson September 1989; revised April 1990.

EHS

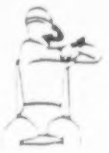
Health & Safety Update

Environmental Health and Safety
University of Washington

June 1988

Video Display Terminal Users -- Try Some Stretching Exercises

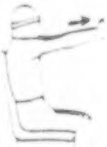
When working at a computer terminal for extended periods, muscles become tense from continual use of the same muscles. Try these stretching exercises to relieve that tension. They can be done while sitting or standing at your terminal (while giving your eyes a brief break too!).



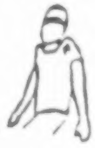
Hold your right arm just above the elbow with your left hand. Now gently pull your elbow toward your left shoulder as you look over your right shoulder. Hold stretch for 5-10 seconds. Do both sides.

Interlace your fingers above your head, with your palms facing upward. Push your arms slightly back and up. Hold stretch for 5-10 seconds.

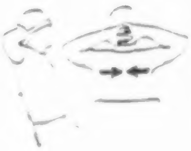
Lean your head sideways toward your left shoulder as your left hand pulls your right arm down and across, behind your back. Hold as easy stretch for 5-10 seconds. Do both sides.



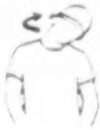
Interlace your fingers, then straighten your arms out in front of you with palms facing out. Hold stretch for 5-10 seconds.



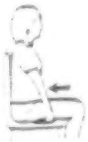
Slowly roll your shoulders forward 5 times in a circular motion . Then roll them backward with the same circular motion.



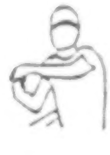
Interlace fingers behind your head, keep elbows straight out to side with your upper body in a good aligned position. Pull your shoulder blades together. Hold feeling of releasing tension for 5-10 seconds, then relax.



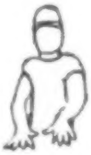
Sit in a comfortable position. Gently rotate head from side to side.



With palm of your hand flat, thumb to the outside and fingers pointed backward, slowly lean arm back to stretch your forearm. Keep palms flat. Hold for 5-10 seconds.



Put elbow on table with your hand raised. With other hand, gently bend your hand so that the back of your hand is aiming to the top of your forearm. Repeat with opposite hand.



With palms down, spread your thumb and fingers as far apart as you can. Hold for 5 seconds. Relax. Repeat.

Take about 5 minutes every hour to run through these exercises. You'll feel better and be able to maintain higher performance for a longer time. For safe stretching, use slow, even motion (don't bounce).

Please post or circulate

172

BEST COPY AVAILABLE

THE ILLUSTRATED GUIDE

to TERMINAL FITNESS

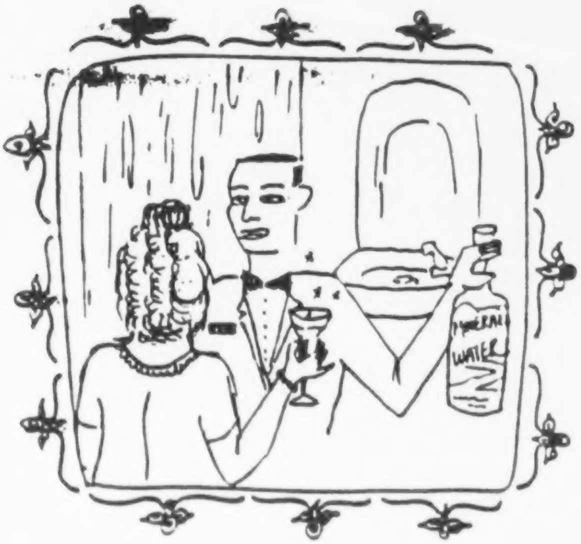
OR

Everybody Ready?
Let's Begin!

Composed for your
edification and delight

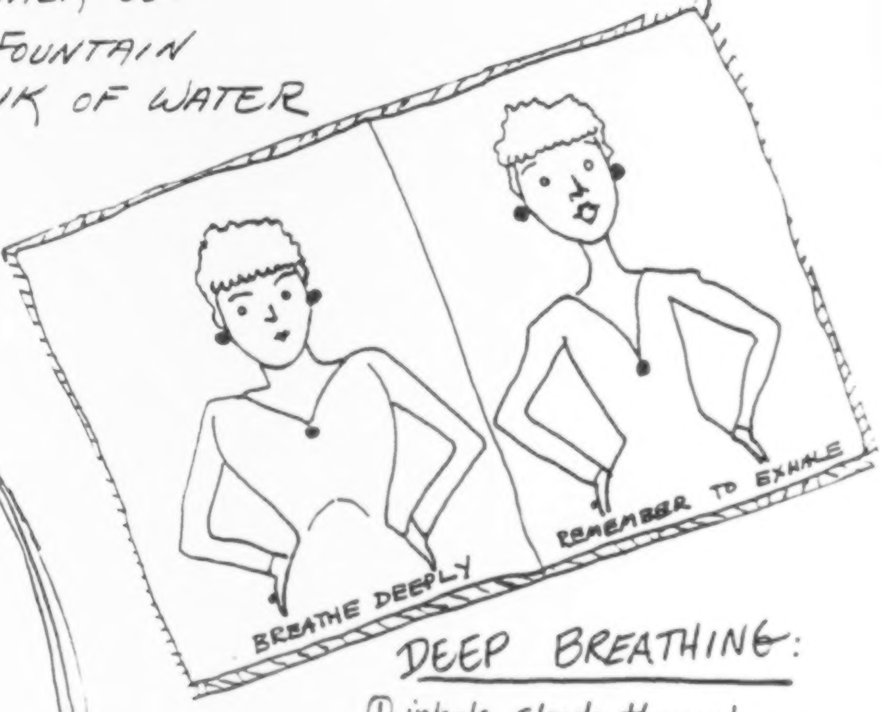
by

S.C. HANKINS
M.L. WHITING
and
N.A. MORROW & M.S. BURTON


MINERAL WATER

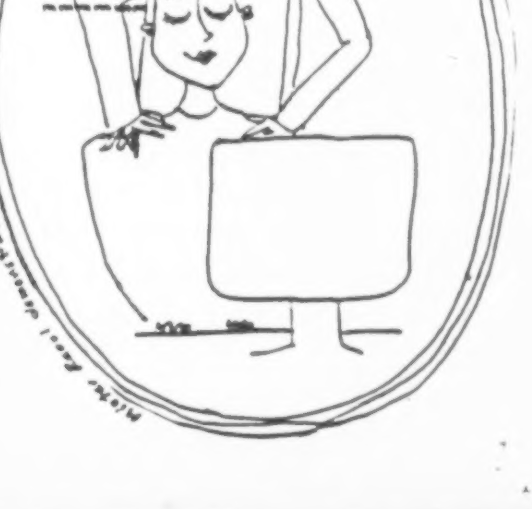
BEGIN HERE ←

WALK AROUND - WALK OUT
TO THE DRINKING FOUNTAIN
AND GET A DRINK OF WATER


BREATHE DEEPLY
REMEMBER TO EXHALE

DEEP BREATHING:

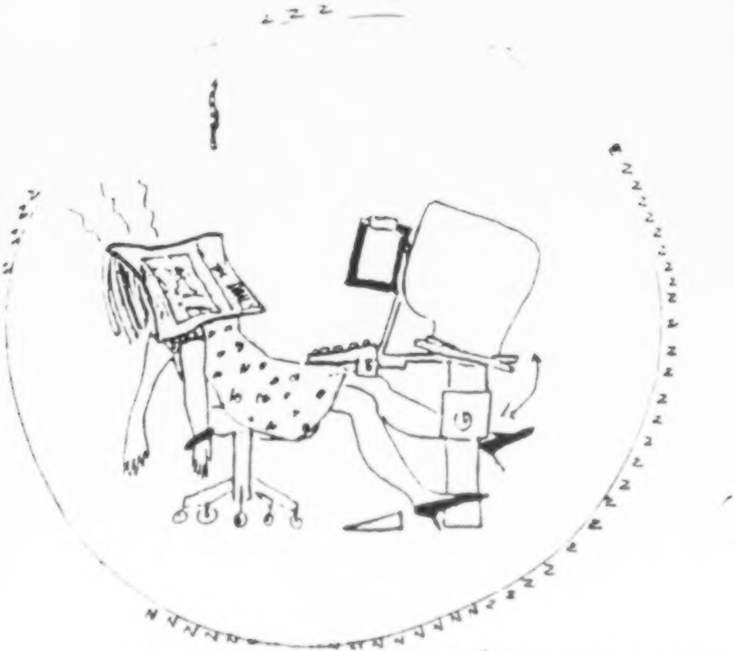
① inhale slowly through nose,
② hold 5 seconds
③ exhale slowly through mouth



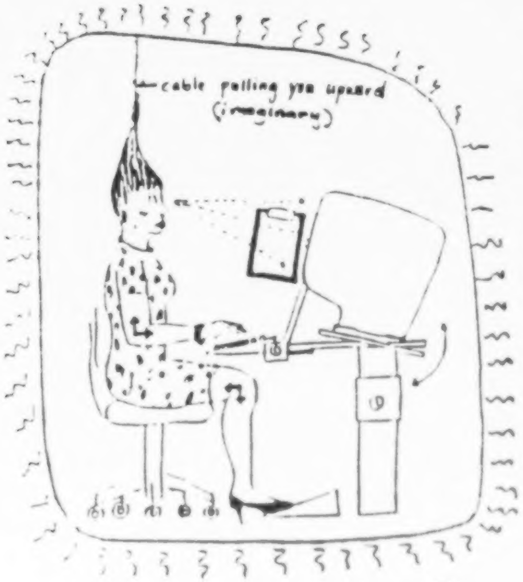
Mister Raool demonstrates the shoulder massage to the Staff.

Massage

head, eyes, forearms,
wrists, hands



EXAMPLE OF INCORRECT DATALIGNMENT©


cable pulling you upward
(imaginary)

Remember! wrists are straight
back is straight
think right angles

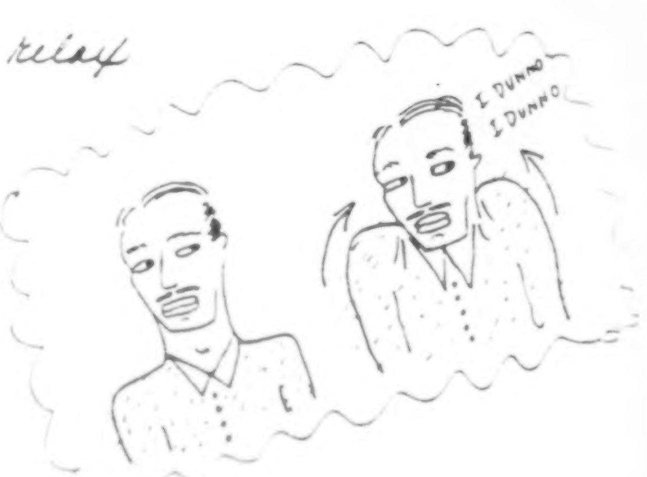
CORRECT DATALIGNMENT©

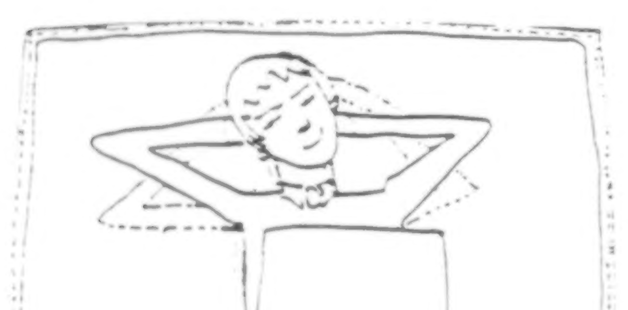
CORRECT POSTURE AT THE TERMINAL:

① imagine a cable attached to the top of your head, pulling you up

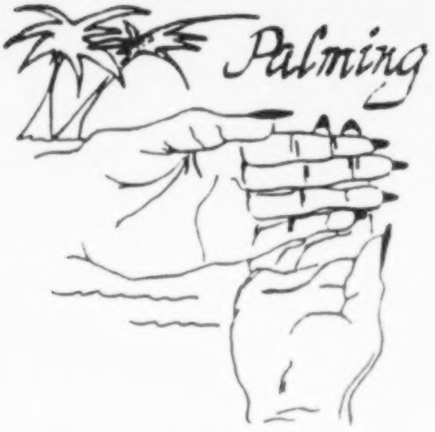
② Shrug shoulders, hold, relax

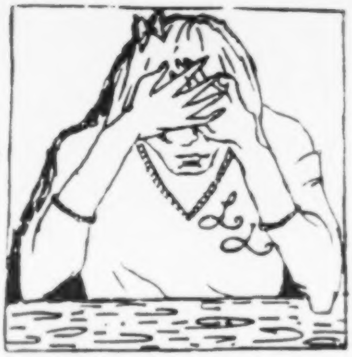
③ lock hands behind head, stretch back in your chair


I DUNNO
I DUNNO



PAGE 3.



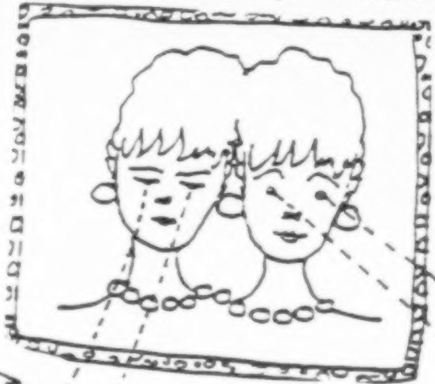


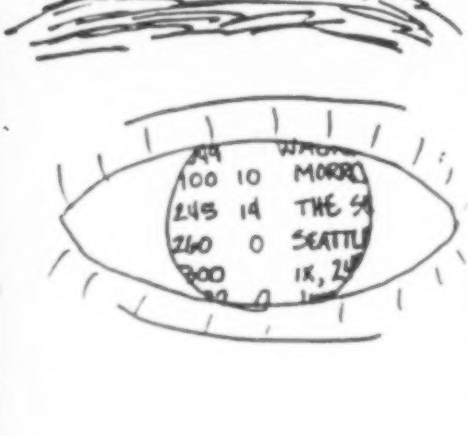
Palm for tired, irritated eyes
Palm for headache
Palm for stress and fatigue

(Cup your hands over your eyes & breathe deeply.)

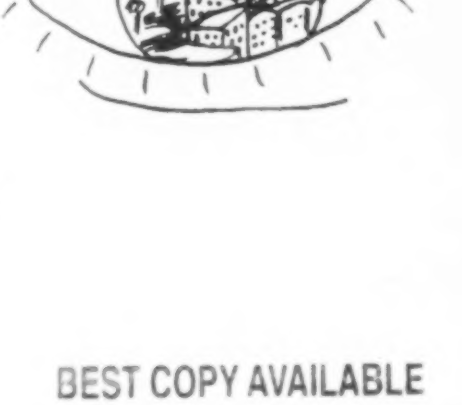
DO THIS **LOTS!** THEN GRADUALLY OPEN EYES & REMOVE HANDS

Change focus → ↓ ↘



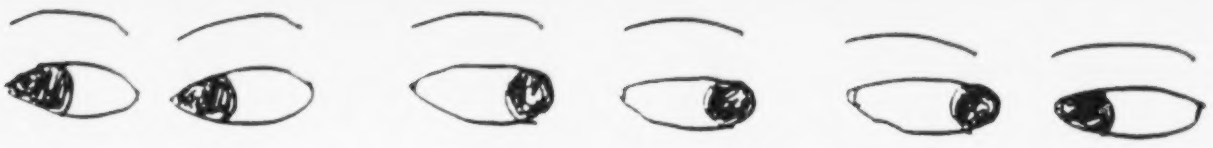

99 WASHI
100 10 MORRO
245 14 THE S
260 0 SEATTL
300 1X, 2

look out window, Stare blankly into space (needle) →



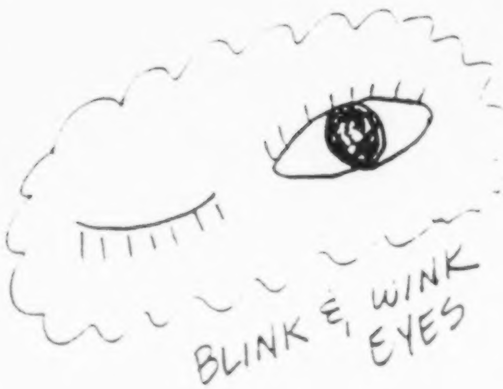
NOTE:
(IF you attempt this for a whole hour, Someone may notice.)

BEST COPY AVAILABLE



ROTATE EYES

- REMEMBER TO: Yawn
  (as if anyone needs to be reminded)

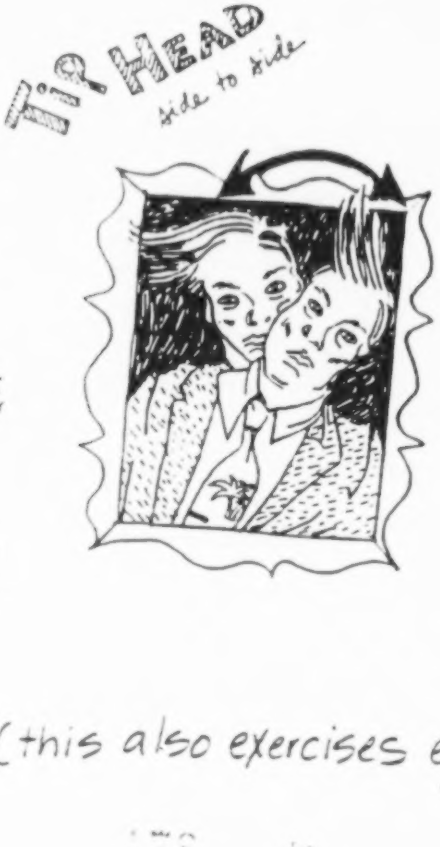

BLINK & WINK EYES

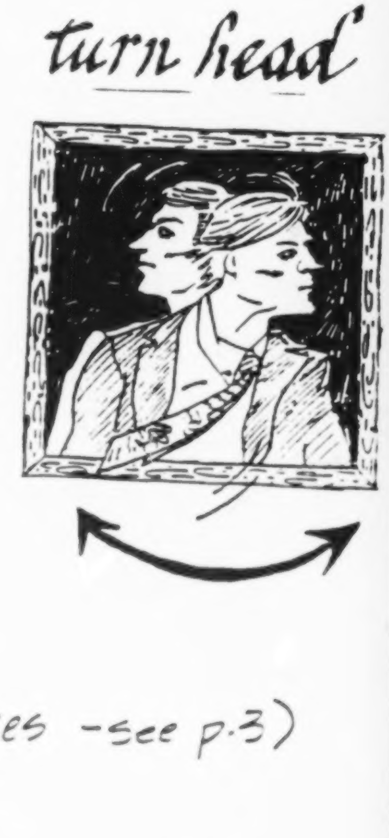
TIP HEAD FROM SIDE TO SIDE:

- stretch upward at center position.

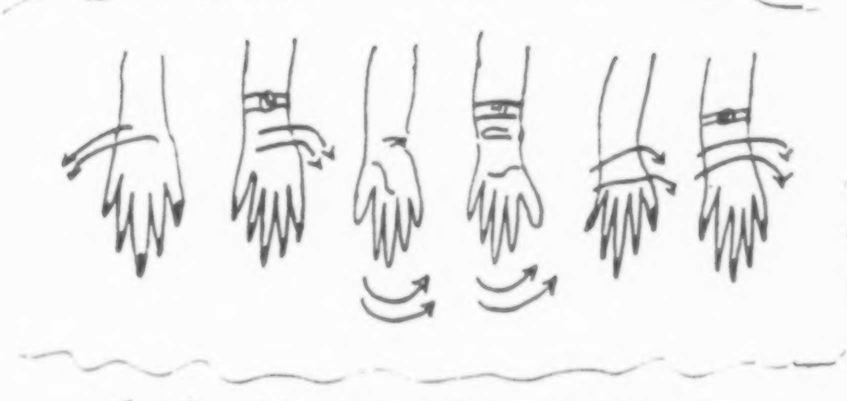
TURN HEAD FROM SIDE TO SIDE:

- turn head & look over shoulder while stretching upward.
- do not slip disc.
- stare at your neighbor (this also exercises eyes -see p.3)


TIP HEAD
side to side

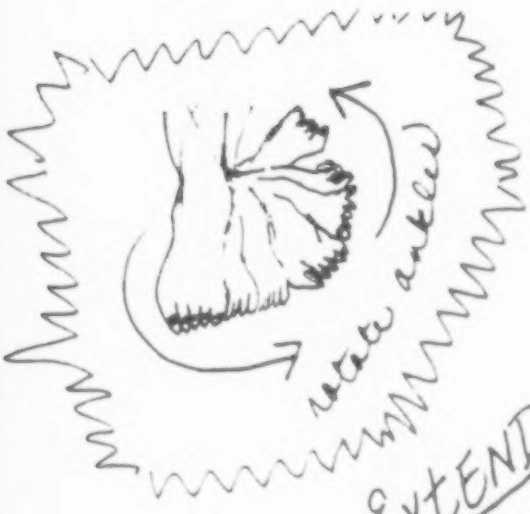


EXTEND arms, rotate palms

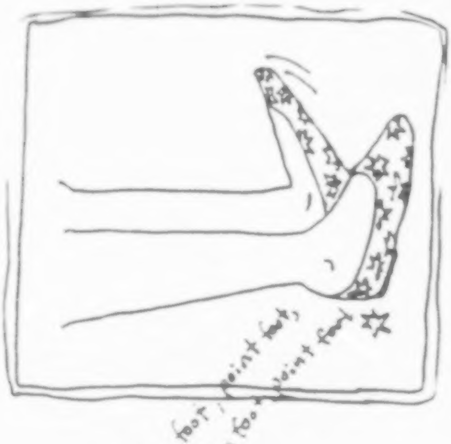


FLIP HANDS OVER & BACK

EXTEND legs, rotate ankles


rotate ankles

EXTEND legs, flex feet



☆ flex foot, point foot,
flex foot, point foot ☆

Finish Here.

PAGE 5

(now don't you feel better!

SPEC

SYSTEMS AND PROCEDURES EXCHANGE CENTER

SELECTED READINGS

ASSOCIATION OF RESEARCH LIBRARIES OFFICE OF MANAGEMENT SERVICES

150

Association of Research Libraries, Office of Management Services. *Microcomputers in ARL Libraries*, SPEC Kit #104. Washington, DC: ARL, 1984.

Brisson, Roger. "The Cataloger's Workstation and the Continuing Transformation of Cataloging," *Cataloging and Classification Quarterly* 20, no. 1: 3-23; 20, no. 2: 89-104.

Brisson, Roger, and Janet McCue. "Retooling Technical Services: the Development of Technical Services Workstations," *Encyclopedia of Library and Information Science* 58 (forthcoming). (Also to be published simultaneously in *Encyclopedia of Microcomputers* 18 (forthcoming)).

Cooperative Cataloging Council (CCC). *The Program for Cooperative Cataloging Five-year Strategic Plan: 1994-1999.* Also available in *Towards a New Beginning in Cooperative Cataloging: the History, Progress, and Future of the Cooperative Cataloging Council.* Washington, DC: Library of Congress Cataloging Distribution Service, 1994.
Available on gopher://marvel.loc.gov:70/00/services/cataloging/coop/coop_cncl/strategic.pln.

Cooperative Cataloging Council (CCC) Automation Task Group. *Report of the Cooperative Cataloging Council Automation Task Group, Dec. 9, 1994.*
Available on gopher://marvel.loc.gov:70/00/services/cataloging/coop/coop_cncl/tgauto.

Hine, Betty N. "Automated Workstations for Professional Catalogers: a Survey of 100 non-ARL Academic Libraries," *Library Resources & Technical Services* 36, no. 1: 96-104.

Kaplan, Michael. "From Worksheet to Workstation: Technical Services Workstations in Harvard College Library's Cataloging Services Department," *Harvard Library Bulletin* n.s. 6, no.1: 8-12.

Kiegel, Joe. *Analysis of the Technical Services Workstation Survey.*
Available on gopher://marvel.loc.gov:70/00/services/cataloging/coop/coop_cncl/tswanaly.

Kiegel, Joe. *Summary of the Technical Services Workstation Survey.*
Available on gopher://marvel.loc.gov:70/00/services/cataloging/coop/coop_cncl/tswsurv.

Rogers, Sally A. "Automated Workstations for Professional Catalogers: a Survey of ARL Libraries," In *Building on the First Century: Proceedings of the Fifth National Conference of the Association of College and Research Libraries.* Chicago: ACRL, 1989.

Williamson, David. "Toward the Intelligent Workstation," *LC Cataloging Newsline* 3, no. 12.